

A PROSPECTIVE STUDY OF ANALYSIS OF MATERNAL MORTALITY IN TERTIARY CARE CENTRE

Obstetrics & Gynaecology

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ABSTRACT

Pregnancy and motherhood are natural processes in the lives of women of reproductive age. These processes are generally considered to be positive and fulfilling experiences. However, for various reasons, many women end up dying as a result of these processes. Improving maternal health and reducing maternal mortality are accepted as human rights challenges and prioritized in several international declarations and national policies. However, progress in achieving these objectives still remains poor. Maternal mortality is an important indicator of health. The study was undertaken to generate information and knowledge regarding the causes and complications leading to maternal deaths (MDS) in a tertiary care hospital, to find if any of them are potentially preventable, and to use information thus generated to save lives.

KEYWORDS

Maternal mortality, Tertiary care, Indicator of health.

INTRODUCTION

A mother is she who can take the place of all others, but whose place no one else can take.' Pregnancy and motherhood are inherent experiences for women of childbearing age and are often seen as positive and enriching. Unfortunately, there are various reasons why some women don't survive these processes. Improving a new mother's health and decreasing the mortality among new mothers are recognized as crucial human rights issues and given priority in international agreements and national policies. Despite these efforts, progress towards achieving these goals has been limited.

Maternal mortality refers to the death of a woman while pregnant or within 42 days of giving birth, due to causes related to or worsened by pregnancy or its management, but excluding accidental or incidental causes. This definition allows for categorizing maternal deaths as either direct or indirect.

Direct maternal deaths occur from obstetric complications during pregnancy, delivery, or postpartum, such as haemorrhaging or hypertensive disorders, or from issues with medical interventions or treatments. Indirect maternal deaths result from pre-existing diseases or diseases developed during pregnancy that is exacerbated by the physiological effects of pregnancy, such as cardiac or renal diseases. The term "death during pregnancy, childbirth, and the puerperium" is included in the ICD-10 and encompasses any death that occurs during this period, regardless of the cause, whether it be accidental or incidental.^[1] Improving a woman's maternal health and reducing the death rate of women while giving birth, have been the key goal all over globe, particularly in India. According to WHO, approximately 830 women die globally every day from cases that can be preventable for maternal death. According to WHO 99% of these deaths occur in developing countries and two countries account for one third of all global maternal deaths, India at 17% and Nigeria at 14%.^[1]

In the year 2013, under the Ministry of Home Affairs in India, the office of the Registrar General stated, that the death rate for new mothers was 178 for 100,000 live births.^[2] The causes for such deaths are different and can be comparable with various medical circumstances, issues related to logistics, collapse in the healthcare system, availability of transportation, as well as certain factors like social, cultural, as well as political factors that affects a women's health and health pursuing behaviour. This study targets to examine the reasons of maternal mortality in India.

The aim of the study is to generate information and knowledge regarding the causes and complications leading to maternal deaths (MDS) in a tertiary care hospital, to find if any of them are potentially preventable, and to use information thus generated to save lives as well as to study the medical and as well as socio cultural causes of maternal mortality.

AIMS AND OBJECTIVES

- The aim of this study is to generate information and knowledge regarding the causes and complications leading to maternal deaths (MDs) in a tertiary care hospital, to find if any of them are potentially preventable, and to use information thus generated to save lives.
- To study the medical and as well as socio cultural causes of maternal mortality.

MATERIALS AND METHODS

A prospective observational study was conducted in the department of obstetrics and gynaecology of this hospital for over a period of 2 years (2020-2022). Data regarding maternal mortality was collected from maternal mortality register after obtaining permission from the medical superintendent of the hospital the details of maternal deaths was collected and analyzed with respect to epidemiological parameters. A total of 102 maternal deaths were considered including those who fulfilling inclusion and exclusion criteria.

Inclusion Criteria:

All women died while being pregnant or within 42 completed days of termination of pregnancy, irrespective of the duration or site of the pregnancy, from any cause related to or aggravated by pregnancy.

Exclusion criteria:

Women died from accidental or incidental causes, death due to suicide and homicide were excluded from the study. Brought dead are also excluded.

OBSERVATIONS AND RESULTS

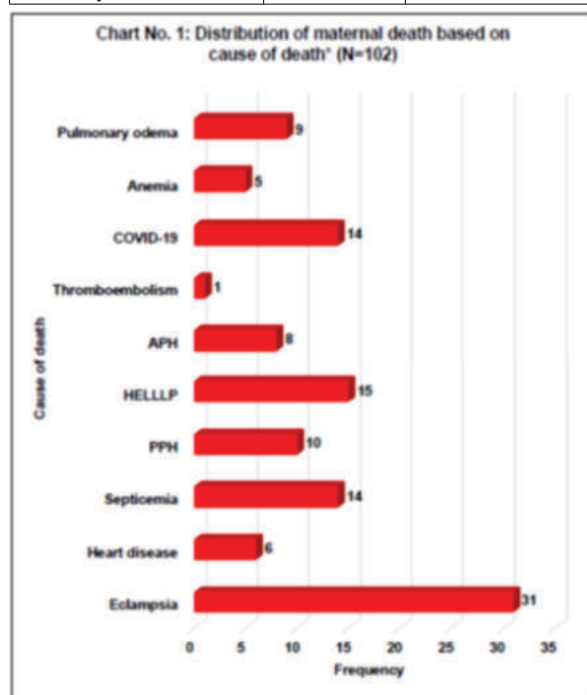
- Most of the maternal death occurred in the age group of 20 to 24 i.e. 31.4%. This was followed by the age group of 25 to 29 years (25.5%) and less than 20 year (24.5%). There was only 11.8% and 6.9% of maternal death in the age group of 30 to 34 years and more than 35 years.
- Around 72.5% of maternal deaths were from rural area while 27.5% were from urban area.
- More than half of the maternal deaths occurred among the women belonging to lower socioeconomic group (57.8%). 33.3% and 8.85% were from middle and upper socioeconomic class.
- Based on the gravida status 43.1% were primi. 28.4% and 12.7% were second and third gravida respectively. Less than 15% were fourth and more than fourth gravida.
- Most of the husbands of the study patients were educated up to primary (37.3%) and secondary and above (33.3%). Around 30% were illiterate in the present study.
- Majority (43.2%) of the study patients were educated up to primary class. 17.6% were educated up to secondary and above. 39.2% of women were illiterate.

- In the present study 42.2% of the husbands were laborers by occupation. 35.3% and 22.5% were farmers and workers respectively.
- Most of the patients were homemaker's i.e 51% in our study. 20.6%, 16.7% and 11.8% were farmers, labourers and workers respectively.
- In the present study 56.9% of patients had registered during the antenatal period while 43.2% had not.
- In our study 24.5% of patients had at least 3 and more number of antenatal visits. 48% had only 2 and 27.5% had only single antenatal care.
- 94.1% of the patients had taken tetanus toxoid injection during the antenatal period while 4.9% had not and the immunization status was unknown for 1%.
- Most of the maternal deaths i.e. 93.1% had occurred post-delivery of baby. 2.9% had occurred each in third and second trimester. 1% of death happened in first trimester.
- It was seen the 65.7% of maternal death occurred among women with risk factors, while 34.3% had no known risk factors.
- 89.5 % of women with high risk factor had received treatment for their health condition while 10.4% did not receive any treatment. Majority (73.5%) of the maternal death had occurred among women who had been referred to our hospital while 26.5% were not referred.
- We received most of the referral from district hospital (42.6%) followed by private health centre (30.6%) and sub-district hospital (10.6%). Referrals from Municipal corporation hospital, Rural hospital and PHC contributed to less than 10% of maternal death in our centre.
- Only 5.3% of patients were referred to other health care facility before reaching our tertiary centre, while the remaining 94.6% were directly referred to us.
- In was documented that only 20% received treatment at the referring centre before reaching ours while the remaining 80% did not receive any treatment.
- Around 88.4% of women reach our health centre within 3 hours of referral. It took more than 3 hours to reach our centre by 14.7% of patients.
- 33.3% patients had to travel less than 50 kms to reach our centre while the remaining had to travel more than 50 kms. 6.9% had to travel more than 100 kms
- 74.5% had reached our centre in the government ambulance while 13.7% and 10.8% had to travel by public vehicle and private vehicle respectively.
- In our study 46.1% of patients received treatment during the transit from referring centre to our centre, while 53.9% did not receive it.
- We found that only 42.2% of the patients were accompanied by health care personnel, while the remaining 57.8% were brought by the family members.
- 64.7% were not in labour when they reached our centre. 18.6% and 16.75 were in post-partum and in-labour at the time of admission.
- In the present study 88.2% were in their postpartum period during the time of death while 7.8% and 3.9% were undelivered and post abortal period.
- Most of the patients i.e. 59.8% were in serious condition during admission while 40.2% were stable.
- LSCS was the most common (67.7%) mode of delivery among women with maternal death. Vaginal delivery was done among 22.6%, undelivered in 6.9% and aborted in 2.9%.
- We documented that 63.7% of maternal death had live birth. 25.5% were IUD, 6.9% undelivered with 3.9% aborted.
- Blood transfusion was given to 65.7% of women who had maternal death. 34.3% did not need blood transfusion.
- Most of the women (47.1%) died with 24 hours of admission. 36.3% in 1 to 2 weeks, 12.7% in 1 to 3 day and 12.7% in 4 to 7 days. Only 1% died after 2 weeks of admission.
- Most of the death (43.1%) occurred within 24 hours of delivery. 22.5% and 14.7% died in 4 to 7 days and 1 to 3 days respectively. Less than 10% of death occurred beyond 1 week.
- Most of the deaths (91.2%) were due to type 1 delay. 5.9% had both type 1 and 2 delay while 2.9% had type 2 delay.
- 62.7% had direct cause of maternal death while 37.3% had indirect causes contributing to death.
- Our study found 34.3% of maternal death patients had hypertension, 28.4% had anaemia, 18.6% had each heart disease and COVID-19, 10.7% had sepsis and 4.9% had thromboembolism. Less than 1% had diabetes, AKI, bowel obstruction, perforated appendix, breast abscesses, and asthma.

- The most common cause maternal death in our study was eclampsia (30.3%), HELLP (14.7%), septicemia (13.7%), COVID-19 (13.7%). Other causes were PPH (9.8%), pulmonary edema (8.8%) and APH (7.8%). Heart disease, thromboembolism and anaemia contributed to less than 6% of causes.

Table No. 01: Distribution of maternal death based on cause of death (N=102)

Cause of death	Frequency	Percentage
Eclampsia	31	30.3
Heart disease	6	5.8
Septicemia	14	13.7
PPH	10	9.8
HELLLP	15	14.7
APH	8	7.8
Thromboembolism	1	0.9
COVID-19	14	13.7
Anemia	5	4.9
Pulmonary odema	9	8.8



DISCUSSION

According to our analysis, 31.4% of maternal deaths occurred among women aged 20 to 24. The age range of 25 to 29 years (25.5%) and younger (24.5%) were close behind. Only 11.8% and 6.9% of mothers died between the ages of 30 and 34 and over 35, respectively. Overall, the age range of 20 to 30 years (56.9%) was where the majority of deaths took place. In a study by Bharti, S. et. al.,^[3] 20 to 30 years saw the highest death rate (82%), followed by 30 to 40 years (12%). 70 to 75 percent of maternal deaths occurred between the ages of 20 and 24 according to Jadhav, CA. et. al.^[4] and Bhaskar, M. et. al.^[5] studies.

Rural areas accounted for about 72.5% of maternal deaths, whereas urban areas accounted for 27.5%. Around 83 to 85% of maternal mortality in rural areas were observed by studies by Sona Singh et al.^[6] and Sahu Bharti et al.^[3] This can be an indication that rural areas are less likely than metropolitan areas to have access to healthcare facilities, to use them to their full capacity, or to follow medical advice. Rural are as low literacy rates may also be a factor.

In present study, more than 50% of all pregnancy - related deaths (57.8%) involved women from lower socioeconomic backgrounds. Middle and upper socioeconomic class represented by 33.3% and 8.85% respectively. According to Ratan Das et al.^[7] there are 86% of maternal deaths among lower class women, 14% among middle class women, and none among upper class women. According to Jadhav et al.^[4] 71.4% of lower-class deaths and 28.3% of middle-class deaths. According to all research, poorer socioeconomic groups have higher maternal mortality. This may be caused by a number of things,

including a bad diet, insufficient health screenings, cultural customs, etc.

In present study, 43.1% of those with a gravida status were primi. There were second and third pregnancies in 28.4% and 12.7%, respectively. Less than 15% of women who were fourth or more pregnant. Approximately 46% of maternal deaths occurred in primi, 36% in second gravida, 12% in third gravida, and only 6% with gravida 4 and higher, according to Narendra et al.^[8] as well. Primi para was reported by Murthy et al.,^[5] Jadhav et. al.^[4] and Bharati et. al.^[3] to be between 40 and 50%, which was higher than the other gravida.

The majority of the husbands of study patients had at least an elementary education (37.3%) and a secondary education or above (33.3%). In the current study, almost 30% of participants were illiterate. While the majority of survey participants who were female (43.2%) had only completed primary school, 17.6% had completed secondary school, and 39.2% were illiterate. The majority of the other research had simply evaluated the women's educational status. According to Ratan Das et.al.^[7] 77.4% of women were illiterate, while 16.2% and 6% of them had only completed their primary or secondary school. 65% of people, according to Murthy et al.^[5] and Jadhav et al.^[4] respectively, are illiterate.

In general, the percentage of illiteracy was highest across all studies. As a result, education may be a key factor in preventing maternal fatalities. According to a study by Ganatra et al.^[9] women with illiterate husbands had a 4.8-times-higher risk of maternal death than women with educated husbands.

In our analysis, 56.9% of patients had antenatal registrations, compared to 43.2% who did not. In comparison to studies conducted by Ratan Das et al.,^[7] Sona Singh et al.^[6] and Bharati et al.,^[3] the percentage of registered cases in our study was much greater.

We found that 24.5% of patients had at least 3 and more number of antenatal visits. 48% had only 2 and 27.5% had only single antenatal care. 94.1% of the patients had taken tetanus toxoid injection during the antenatal period while 4.9% had not and the immunization status was unknown for 1%. A study by Surehka et. al.^[10] reported 64% cases of maternal death had less than 3 antenatal visits.

It was observed that women with risk factors accounted for 65.7% of maternal deaths, compared to those with no known risk factors (34.3%). According to our research, 89.5% of women with high risk factors had received treatment for their medical condition, whereas 10.4% had not. According to a study by Jadhav et. al.^[4] the majority of high-risk cases were referred to their centre as a result of which they had a high maternal mortality rate that was recorded.

We found that live births accounted for 63.7% of maternal fatalities. 25.5% were IUDs, 6.9% were stillborn babies, and 3.9% were aborted. In a similar vein, Jadgish, B. et al.^[11] reported in their study 62.3% live births, 14.1% still births, 12.7% undelivered, and 10.9% abortions. The outcomes of live births are equally important because these children require good care up until they enter adulthood. Without adequate nutrition, breast milk swapped with other options when a child's mother is not around can cause a number of severe health problems.

Within 24 hours of admission, the majority of the ladies (47.1%) passed away. 12.7% in one to three days, 36.3% in one to two weeks, and 12.7% in one to seven days. Only 1% of patients died after two weeks. 91% of deaths, according to Ratan Das et.al.^[7] research, take place within 24 hours, and only 9% do so after that. 91.2 percent of deaths were caused by type 1 delay. While 2.9% experienced type 2 delay, 5.9% had both types 1 and 2 delays. Similar to this, Surekah et. al.^[10] reported that 85.8% of delays were caused by type 1. A case-control study was carried out by Ganatra et. al.^[9] to evaluate the three delays. The time required for a type 1 delay was 2 hours in the control case and 8 hours in the case. Control took 2.5 hours and 4.9 hours for type 2 and type 3 delays, respectively, and 4.1 hours and 12.1 hours for the remaining cases. 37.3% of maternal fatalities had indirect reasons leading to them, whereas 62.7% had direct causes. According to a study by Murthy et al.^[5] 72.5% of deaths were attributed to direct causes, and 27.5% to indirect ones. Similar results were also found by numerous other investigations.^[3,4,6,12,13]

In our analysis, eclampsia (30.3%), HELLP (14.7%), septicemia

(13.7%), and COVID-19 (13.7%) were the most frequent causes of maternal death. PPH (9.8%), pulmonary edema (8.8%), and APH (7.8%) were additional causes. Less than 6% of reasons were attributable to anaemia, thromboembolism, and heart disease. In their five-year study on maternal mortality related to eclampsia, Ratan Das et. al.^[7] discovered that eclampsia was to blame for 43.4% of maternal deaths. Eclampsia and pre-eclampsia were shown to be the most common causes of maternal deaths by Bharati et. al.,^[3] accounting for 40.1% and 9.46% of all maternal deaths.

To summarize the cause of maternal mortality, the common direct causes are clampsia, hemorrhage and sepsis, while among the indirect causes, anemia, jaundice and cardiovascular disease.

CONCLUSION

In our study, we studied the 102 maternal deaths that occurred in the hospital, and it was found that the most common direct causes of maternal mortality, were eclampsia, hemorrhage and sepsis, while the indirect causes, were anemia, jaundice and cardiovascular disease. Lack of education, as well as the socio-economic structure, time taken to reach the medical centre was also some of the major factors that contributed to the maternal death rate. It is also observed that the staff at the hospitals also needs to be trained and educated and should be able to handle emergencies.

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