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Original Research Article

A retrospective analytical study on causes and contributory factors of maternal mortality

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ABSTRACT

Background: Maternal mortality has long been considered as a very good indicator for healthcare quality provided. Pregnancy is considered to be a physiological phase in the lifetime of a woman carrying serious implications on morbidity and mortality. It has been agreed upon that many of the maternal deaths in developing countries can be prevented. This study aimed to study the prevalence of maternal mortality during April 2022- March 2023 in Civil hospital Ahmedabad, tertiary care centre.

Methods: It's a retrospective observational study done at a tertiary care centre in Ahmedabad, Gujarat India. Maternal deaths from April 2022 to March 2023 were looked into. Maternal mortality ratio and causes for the maternal deaths were analyzed and compared. Demographic details were collected and data regarding parity, mode of delivery, gestational age at delivery, antenatal checkups, co morbid conditions, causes of death were noted and neonatal outcomes were noted.

Results: Overall live birth between April 2022-April 2023 were 7700 out of which number of LSCS were 2569 and remaining were vaginal deliveries, the number of maternal deaths were 39 (MMR-505.8/100000 live births). Most common direct c causes were severe preeclampsia/eclampsia and their complications 14 cases (35.89%), followed by sepsis 6 cases (15.38%) and PAS leading to PPH 5 cases (12.82%). The most common indirect cause was sickle cell anemia.

Conclusions: Preeclampsia and their complications and sepsis emerged as the greatest killers. Many of the reasons of maternal mortality were found to be preventable. Early identification and stratification of risks with prompt initiation of necessary management measures are necessary to prevent these deaths.

Keywords: Direct cause, Indirect cause, Maternal mortality, Preeclampsia, Sepsis

INTRODUCTION

Maternal death is defined as the loss of a woman's life during pregnancy or within 42 days of its termination, regardless of the pregnancy's duration or location, due to causes directly linked to or exacerbated by pregnancy or its management, excluding accidental or incidental causes. This loss is profound for both the family and society, reflecting the quality of healthcare accessible to the community. In India, maternal mortality rates have been steadily declining. However, each day sees about 830

women perish from preventable pregnancy and childbirth related causes, with a staggering 99% of these deaths occurring in developing nations.¹⁻⁴

The National Health Policy (NHP) of 2017 set a goal to reduce India's Maternal Mortality Ratio (MMR) to below 100 per lakh live births by the year 2020. Through persistent efforts by the Government, India has achieved a significant milestone by lowering its MMR to 97 per lakh live births during the period of 2018-2020, meeting this target well ahead of schedule.³

Disease outbreaks, conflicts, and other public health emergencies aggravate the situation by increasing the risk of pregnancy complications, disrupting health systems, and posing additional constraints to maternal and perinatal healthcare.⁵

Nearly 303,000 women die per year from maternal causes with almost all of these deaths occurring in low-resource settings.^{6,12} Mortality could be substantially reduced if quality-assured maternal health commodities and services were consistently available, and if unwanted pregnancies were prevented in the first place by increasing access to modern contraception.^{6,7}

Preventable pregnancy and childbirth complications are among the leading causes of maternal mortality, morbidity and disability among women of reproductive age in low- and middle-income countries.⁴

Mortality occurring due to complications related to pregnancy, labor and the puerperium, are termed as the direct causes of obstetric death. Deaths as a result of previously existing condition or a disease, that first occurred during pregnancy are not direct obstetric causes.⁸

Indirect causes of maternal mortality can be exacerbated by the physiological changes that occur during pregnancy. While pre-existing medical conditions like chronic anaemia, chronic hypertension, and diabetes are increasingly worrisome, direct obstetric complications such as postpartum hemorrhage, pre-eclampsia, and infections remain the primary biomedical reasons for maternal death. The risk of maternal mortality significantly escalates when multiple factors are involved simultaneously. This underscores the complex interplay between pre-existing health conditions and acute pregnancy-related complications in maternal health outcomes.⁹

The purpose of orchestration of this study was to determine the magnitude of maternal mortality and the various factors contributing to it in our tertiary care centre. This study aimed to study the prevalence of maternal mortality during April 2022- March 2023 in civil hospital Ahmedabad, tertiary care centre.

METHODS

Study setting

It is a retrospective observational study done in a tertiary care centre in Ahmedabad, India. This study conducted at BJ Medical College Ahmedabad, India. Maternal deaths from April 2022 to March 2023 were studied.

Procedure

All the causes for the maternal deaths were analysed and compared. On admission detailed clinical history was taken and examination was done. Demographic details

were noted including age, parity, mode of delivery, gestational age at delivery, antenatal checkups, pregnancy related complications, causes of death and neonatal outcomes were noted.

Inclusion criteria

All cases of maternal mortality were studied.

Exclusion criteria

All cases of near miss and healthy patients excluded from the study.

The study was approved by ethical committee.

Statistical analysis

The data for all parameters were collected, tabulated and frequency and percentage were calculated accordingly.

RESULTS

Overall live birth between April 2022-April 2023 were 7710 out of which number of LSCS were 2569 and remaining 5141 were vaginal deliveries. Maximum number of mortality was in age group 21-30 years (Table 1).

Table 1: Distribution of maternal mortality according to age group.

Age group (years)	<20	21-30	31-40	41-50
Maternal death (n =39)	4	32	3	0
Percentage	10.20	79.40	10.20	0.00

Total 10 (25.64%) of the 39 were primigravida remaining 29 (74.35%) were multigravida (Figure 1).

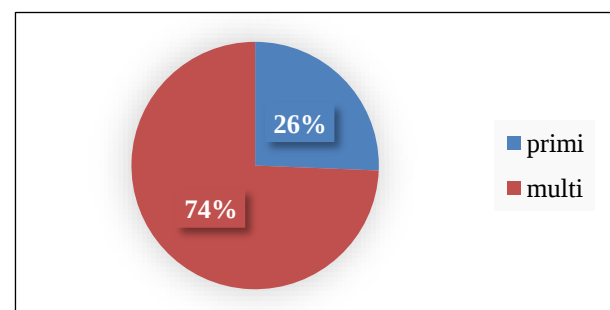


Figure 1: Distribution of maternal death according to gravidity.

Among the 39 maternal deaths, 18 (46.1%) were vaginally delivered, 20 (51.28%) were delivered by CS, one underwent laprotomy (2.56%) (Table 2).

The number of mothers who took the ANC care were 20 (51.2%), 7 did not take any ANC (17.94%), and status of 12 (30.76%) was not known (Table 3).

Table 2: Distribution of maternal deaths according to mode of delivery.

Mode of delivery	No. of patients (%)
Vaginally delivered	18 (46.1)
Caesarian section	20 (51.28)
Laprotomy	1 (2.56)
Total	39

Table 3: Distribution of maternal death according to ANC care status.

ANC care status	No. of patients
Received	20
Not received	7
Status not known	12

Table 4: Distribution of maternal deaths according to causes.

Causes	N	Percentage
Direct	30	76.92
Indirect	7	17.94
Unknown	2	5.12

Direct causes that resulted in maternal death are 30 (76.92%), indirect are 7 (17.94%) and 2 (5.12%) unknown (Table 4). Out of Direct causes most common cause was severe preeclampsia/eclampsia and their complications 14 cases (35.89%), followed by sepsis 6 cases (15.38%) and PAS leading to PPH 5 cases (12.82%). Other cases including direct causes were AFLP, ruptured ectopic pregnancy (Table 5).

Table 5: Distribution of maternal deaths according to direct causes.

Causes	N	Percentage
Severe preeclampsia	14	35.89
Sepsis	6	15.38
PAS	5	12.82
AFLP	1	2.06
Ruptured ectopic	1	2.06

Table 6: Distribution of maternal death according to their referral status.

Referral status	Number	Percentage
Referred	30	76.92
Non referred	9	23.07

In indirect causes most common cause was sickle cell crisis 3 cases (7.69%), other causes were acute pancreatitis, tetanus, tubercular meningitis.

Out of 39 cases 30 were referred (76.92%) (Table 6). 5 patients died antenatally (12.82%). The rest 34 patients were postnatal (87.17%).

Out of 39 maternal deaths that occurred 19 (48.7%) had live birth. 9 mothers had IUD (23.07%). 4 had still birth (10.25%), 2 abortus delivered (5.1%), 3 PNM (7.69%) occurred and one underwent laprotomy for ruptured ectopic (Table 7).

Table 7: Distribution of maternal deaths according to outcomes of pregnancy.

Outcomes of pregnancy	No. of patients
Live birth	19
IUD	9
SB	4
Abortus	2
PNM	3
Total	38

DISCUSSION

The maternal mortality ratio in the study period was 505.8/100,000 live births being. MMR in our study still remains quite high, more than our national average. It can be explained by the fact that our health facility is a referral/tertiary care hospital for various hospitals in and around Gujarat.

Majority referred from other public/private facility (76.92%) across the state and neighbouring states. Most of these women presented to us in serious (76.92%) or critical condition often with multiple complications and expired within 24 h of admission to the hospital (48.71%) and majority of the mortality was due to preeclampsia/eclampsia and their complications (35.89%) which can be prevented by timely proper management which is comparative to Paul et al study.¹⁰

Often the women were referred to hospital when they developed life-threatening complication. Some of these patients were referred to our facility after being previously referred from 1 or 2 facilities. Many of these patients could have been saved by timely and early access to health care services. Delay in reaching tertiary care center were the major factors responsible for high maternal mortality.

Social factors do seem to play in this scenario, with poor status of women especially in lower socioeconomic status, social and cultural inhibitions and lack of awareness leading to delay in the women or her family seeking timely help. Also, lack of availability of blood and blood components/blood bank, emergency obstetric care facility, trained manpower, ICU facility at various centers across the state and neighbouring states has been identified. This often leads to patient being referred from one facility to the other without receiving appropriate medical care. Lack of antenatal visit was identified as the predominant risk factor for maternal mortality. Which is comparative to Amoo et al.¹¹

This study, multipara comprised 74.35% of maternal mortality, respectively, reflecting the need to strengthen family planning services so that every pregnancy is wanted and planned. In multipara group, deaths were due to hypertensive disorders, followed by sepsis. Repeated pregnancies within a short span of life along with poverty, poor hygiene and nutritional deficiency are the major causes for anemia in multipara women. Also, grandmultipara needs to be monitored carefully for hypertension. But unfortunately in India, due to negligence they present to hospital only at a late stage when complications develop.

In this study majority of the deaths belonged to 21-30 years age group, which can be due to the social situation seen in our community, where most of the pregnancies happen in this age group. At the same time it is noteworthy that teenage pregnancies and advanced maternal age did not pose a major threat to maternal health at least in this study setting in the prescribed time period.

This study is conducted in civil hospital Ahmedabad which is a tertiary care centre, where high risk and referred patients are high and hence mortality ratio is also high. This was limitations of this study.

CONCLUSION

Maternal mortality ratio in our hospital is 505.8 which is quite high. This is probably because our hospital is a tertiary care centre where many cases are referred in view of complications. Preeclampsia/eclampsia and associated complications were the major cause and more emphasis should be put on undertaking all the necessary measures for early diagnosis and proper management and timely referral to tertiary care centers should be encouraged in primary health care facility. Regular maternal death reviews need to be conducted to look into the causes and take necessary steps to prevent them in future.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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