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CJOG CLINICAL JOURNAL OF OBSTETRICS AND GYNECOLOGY
ISSN 2640-2890

Retrospective Study

A Retrospective Analysis of Maternal Mortality in a Tertiary Care Centre at District Level

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Abstract

Background: Maternal mortality is a very sensitive indicator of our health system and services. Epidemiological data about maternal mortality is a vital requirement in every setting not only to design interventional programs but also to identify gaps in the existing structures, to reduce the ratio favorably. This study was an attempt to shed light on the mortality rate in our hospital, to analyze the epidemiological aspects, causes of maternal mortality, and types of delay, and to suggest recommendations for improvement.

Methods: A retrospective study was done at a tertiary care center at the district level from January 2022 to December 2022. Demographic data and details of selected parameters were obtained from maternal death review forms and case records. Data analyzed and presented.

Results: The majority of the maternal deaths could be attributed to direct obstetric causes like Eclampsia (29.41%), Pre-eclampsia (20.59%), and anemia (20.59%) followed by hemorrhage (14.71%), and septicemia (11.76%). Medical conditions contributing to death included liver disorders (5.8%), COVID-19 infection (5.8%), and cardiac disorders (2.9%).

Conclusion: It is evident that the maternal mortality ratio is significantly high, with a majority of the deaths occurring due to avoidable causes. Leading contributory factors were due to delay in seeking help or delay in referral. High-risk cases must be identified at the earliest and referred to higher centers for management from the first trimester itself. Generating awareness among the common public and counseling the gravidas and their caretakers throughout pregnancy is equally important to prevent maternal mortality and near-miss cases.

More Information

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Submitted: April 17, 2024
Approved: May 22, 2024
Published: May 23, 2024

How to cite this article: Dhundi D, Kedar K, Shinde N. A Retrospective Analysis of Maternal Mortality in a Tertiary Care Centre at District Level. Clin J Obstet Gynecol. 2024; 7: 064-068.

DOI: 10.29328/journal.cjog.1001166

Introduction

Motherhood and childbirth are precious encounters in a woman's life, with each being unique in its course. Maternal mortality is a very grievous and unfortunate event, causing unrest not just within the family but the community and the country as a whole. Globally, the standards of care for maternal and child health vary greatly and indicators like Maternal Mortality ratio and Neonatal Mortality rate reflect the quality of healthcare services available.

According to the World Health Organization (WHO), a Maternal death is defined as the death of any woman while being pregnant or within forty-two completed days of termination of pregnancy, irrespective of duration or site of pregnancy from any cause related to or aggravated by pregnancy but not from accidental or incidental causes [1]. Maternal Mortality Ratio (MMR) is defined as the number of maternal deaths during a given time per 1,00,000 live births [1]. Although the Maternal Mortality Ratio worldwide dropped by around 34% between 2000 and 2020, maternal death was reported every 2 minutes in 2020. The majority of this burden is borne by Sub-Saharan Africa and Southern Asia, accounting for 87% of the total global deaths [1].

Since India contributes to about one-fifth of the global births, it gives a little reassurance that the MMR has declined to 97 deaths per lakh live births in 2018-2020 from 103 deaths per lakh live births in 2017-2019 [2]. In 1938, maternal mortality in India was 2000 which was declined to 1000 in 1959 and then it declined to 540 in 1999 [3]. We have a come a long way over the past two decades. However, India is far behind the target set by United Nations-mandated Sustainable Development Goals- 70 deaths per lakh live births by the year 2030 [4]. It is also important to note that despite the overall decline in the MMR over the years, most of the Indian states have a significantly higher MMR, like Assam, Uttar Pradesh, Madhya Pradesh/ Chhattisgarh to name a few [5]. This further highlights the discrepancies in the provision of health care

facilities and this situation must be brought into the limelight, rather than being masked behind the national decreasing trends.

While Maternal Mortality has always been emphasized, it is essential to note that it is just the tip of the iceberg. For every mortality, there are at least 20 mothers who experience severe morbidity expressed as maternal near-miss, which further uncovers the gaps in our systems. Nearly two-thirds of maternal deaths can be attributed to hemorrhage, hypertensive disorders of pregnancy, infections, and complications from unsafe abortions [6]. Anemia is the most common indirect cause of maternal mortality. It is both disheartening and redeeming that these are mostly preventable causes. Early identification, prompt management, and stringent follow-up can help tackle most of the problems causing mortality.

The Government of India has already devised and implemented various National Programmes and Schemes to improve maternal health and thus, eventually prevent maternal deaths. Janani Suraksha Yojana, Pradhan Mantri Surakshit Matritva Abhiyan, Pradhan Mantri Matru Vandana Yojana, and other measures like LaQshya guidelines are being vigorously enforced all over the country. Maternal Death Reviews and Audits are conducted at institutional and district levels to identify the preventable factors and delays in care. Free ambulance services for mothers and neonates and various incentives throughout pregnancy as well as after institutional delivery are provided through these initiatives. Medical Officers, health workers, and other personnel involved at the grassroots level are being trained and sensitized to improve the quality of care meted out at the local level.

Conjoint efforts by the health care workers, as well as the community members and vigilance towards all mothers, can prove to be of immense benefit in the long run. Together, we can truly make this journey of motherhood even more beautiful and worthwhile.

Aims and objectives of our study are as follows

- To analyze the socio-epidemiological aspects of maternal mortality
- To assess the causes of maternal mortality
- To recommend measures to reduce the MMR.

Methods

This retrospective observational study was carried out at Shri Vasantrao Naik Government Medical College, Yavatmal, Maharashtra, a tertiary care center in central India where a large number of patients are referred from rural and interior parts of Maharashtra, including tribal areas. It is the referral center for a large number of Primary Health Centres, Rural Hospitals, and Sub-District Hospitals. This study was an attempt to analyze the causes of maternal deaths, sociodemographic parameters of maternal deaths, and levels of delay so measures for early intervention and prevention can be suggested.

Inclusion criteria

Death of any woman while being pregnant or within forty-two completed days of termination of pregnancy, irrespective of duration or site of pregnancy from any cause related to or aggravated by pregnancy.

Exclusion criteria

Deaths due to suicide and homicide were excluded from the study.

The deaths which met the WHO Criteria for Maternal Death were included in this study. As per the definition of maternal death, death due to suicide and homicide were excluded from the study. Data regarding demographic details and other included parameters was collected from individual case records and maternal death review forms from January 2022 to January 2023. A total of 34 maternal deaths were included and studied.

Detailed history regarding demographic characters, antenatal care provided along type of delay was noted. The type of referring hospital and referral time were noted along with the duration of care received at this hospital and the time and cause of death.

In cases where there was a dilemma in assigning the cause of death due to multiple contributing causes, the major contributory factor was considered.

Types of delay according to the maternal death review form

- Type 1 delay - delay in decision-making to seek help.
- Type 2 delay - delay in transport due to poor roads and unavailability of vehicles.
- Type 3 delay - delay at the institutional level

Sample population and data analysis procedure

As per the definition of maternal death, death due to suicide and homicide were excluded from the study. A total of 34 maternal deaths were carefully studied and analyzed during 1 year study period.

During the study period of 1 year, according to the definition of 'Maternal mortality'.

Maternal mortality cases were retrospectively studied from case records of hospitals. Data regarding demography, antenatal characters, referring facility, transportation, type of delay, avoidable and unavoidable causes of death, treatment, interventions, and hospital stay were collected and analyzed.

Results

The data collected was analyzed and results have been studied and compared. The total number of admissions throughout the study period was 7615, of which 34 maternal deaths were reported. Taking the social-epidemiological parameters into consideration, it is observed that 24 (70.59%) deaths were observed in the age group of 19 years - 24 years and 5 (14.71%) each among the groups of 25 years - 29 years and 30 years - 35 years. The patients predominantly belonged to rural areas (82.35%) i.e. 28 out of the total, while only 6 (17.65%) were residents of urban areas. The majority of the deaths occurred in lower socio-economic groups (76.47%), with patients having less than 3 ANC visits (52.95%) and receiving care at peripheral primary and secondary centers. In total, 11.76% of patients had no visits at all and were brought after delivering at home.

Most of the cases (88.23%) were referred from peripheral centers, and a significant number (55.88%) took more than 4 hours to reach the tertiary center. 16 (47.06%) cases were referred from Rural Hospitals followed by Sub-district hospitals (17.65%). 25 (73.53%) deaths were recorded in the postpartum status and remarkably (47.06%) within 4-24 hours from the time of admission. Significant direct obstetric causes of death included Eclampsia (29.41%), Pre-eclampsia (20.59%), and anemia (20.59%) followed by hemorrhage (14.71%) and septicemia (11.76%). Concurrent medical conditions contributing to death included liver disorders (5.8%), COVID-19 infection (5.8%), and cardiac disorders (2.9%). The particular outcome that Type 1 delay was the most common (82.36%) was an eye-opener.

ICU admission was required for a large bulk of the patients (91.18%), with other observed complications viz., inotropic support (38.24%), extended intubation for more than 12 hours (29.41%), MODS -organ system failure (57.69%), more than 3 Blood transfusions (14.71%). Operative intervention was carried out in only 3 (8.82%) patients.

Discussion

Maternal mortality is an essential index that reflects the reproductive health of society as well as the standards of care provided in general. From 2016 to 2020, the WHO report shows stagnation or worsening of MMR in most regions of the world, except for Australia and New Zealand (which reduced MMR by 34·6%), and Central and Southern Asia (which reduced MMR by 15·7%) [7]. In India, research has shown a diverse variation in the MMR over the past two decades [5,8-10].

The results of this study corresponded with various other studies conducted throughout India and worldwide. A significant majority of the deaths were observed in the age group of 19 years - 25 years (70.59%), belonging to rural areas (82.35%) and lower socioeconomic status (76.47%). Similar findings were noted by a study conducted in Mysore [9]. In some other studies [10-12] maximum deaths were reported in 20 years - 29 years of age and lower socioeconomic strata from rural areas. Most of the cases (88.23%) in our study had been referred from peripheral centers, which was also seen in studies by Ali M [9] and K.M. Harish [12].

Regarding the death parameters, 73.53% of deaths were postpartum, and 47.06% died within 4-24 hours from the time of admission, indicating that most of the patients were brought in an already deteriorating and critical condition. These numbers are consistent with the findings of studies conducted in North India [10,13]. and another study in Mysore [9] also highlight the need for an early referral as well as improving the critical care facilities at tertiary centers by increasing manpower and optimizing workload.

The classical triad responsible for obstetric deaths includes hemorrhage, sepsis, and hypertension in pregnancy (eclampsia, pre-eclampsia). Though obstetric hemorrhage is designated as the leading cause of maternal mortality worldwide [1] and in some other studies [5,12,13] followed by other direct causes, the results of our study differed. Most of the deaths were attributed to Eclampsia (29.41%), Pre-eclampsia (20.59%), and anemia (20.59%) followed by hemorrhage (14.71%) and septicemia (11.76%), comparable with analysis by Govindarajan A [8], Ali M [9] and Vidya Rama [11]. A study in a tertiary center in West Delhi [13] noted ICU admissions in a vast majority of the patients, which was also highlighted in our study as 91.18% of patients required ICU care along with inotropic support (38.24%), extended intubation for more than 12 hours (29.41%) and more than 3 Blood transfusions (14.71%).

Type 1 delay was the most common delay noted (82.36%) succeeded by Type 2 delay in 11.76%, suggesting that the main causes of high MMR can be due to late arrivals to healthcare facilities and home deliveries, also seen in other studies [11,12,14].

All the above observations further highlight that most of the maternal deaths are due to preventable causes, and can be avoided entirely with timely interventions and generating awareness. Health education throughout pregnancy to the mother as well as her family members and the community as a whole is a need of the hour. Nutritional counseling, information about warning signs and high-risk factors, encouragement for seeking treatment along with compliance and the importance of strict follow-up needs to be inculcated in society. Anemia, still a significant contributor to maternal death, needs to be eliminated at the root. Pre-conceptional anemia correction, supplementation throughout pregnancy, and screening with better antenatal care are required to prevent this. The availability of blood and blood products is also a concern that needs to be addressed.

To combat Type 1 and Type 2 delays, early identification

of high-risk cases and timely referral to higher centers can contribute significantly to reducing MMR. Periodic training of Medical Officers at peripheral centers as well as staff nurses, ASHA workers, and other healthcare personnel who work at the grass-root level, is crucial. Programs like Basic Emergency Obstetric Care (BEMOC) and skilled attendant at birth (SAB) need to be implemented along with improving medical facilities in rural areas, including easy availability of essential drugs, emergency medications, transport, and referral services for faster transit, increasing recruitments of health care workers to accompany critical patients during referral.

Various government schemes provide an array of incentives and services like investigations and drugs, during as well as after pregnancy. All efforts are being made to promote 100% institutional deliveries. LaQshya program was launched in 2017 to improve the quality of care in Labour rooms and Maternity operation theatres. Proper implementation of the National Rural Health Mission (NRHM) can play an important role in reducing maternal mortality.

Preventive measures need to be exercised at every level. Health education for adolescents, nutritional corrections, pre-conceptional counseling, antenatal and postnatal care, and follow-up as well as the provision of skilled manpower at every level of our healthcare system are key factors in avoiding maternal deaths. More media exposure, particularly on television and radio, as well as local street plays or awareness sessions about maternal health services and ways to tackle socio-cultural barriers for effective health care utilization, are required in rural areas. A study by Meh C [5] analyzed nationally representative data and called attention to the marked variation in maternal death risk across the country, further indicating discrepancies in the services meted out. It emphasized that the poorer states need to accelerate their rates of progress in reducing maternal mortality if the whole of India is to achieve the UN SDGs. The healthcare system must gear up with referral facilities having trained obstetric care team that comprises obstetricians, anesthetists, intensivists, and nurses to manage the critically ill pregnant mother, to help achieve this goal by 2030 [15].

The high incidence of maternal deaths reflects the poor quality of maternal services, late referral, and low socioeconomic status of the community. The onus of reducing maternal mortality and improving the quality of life cannot be laid on a single sector. Cumulative efforts and involvement of government, health-care workers, financial aid as well as members of the community, and most importantly, mothers and their families, will be needed to achieve our milestones.

Conclusion

Even in the modernized world, maternal mortality is still a cause of concern. Although we are moving forward by leaps and bounds, we still have miles to reach. Most of the deaths are observed in young women from rural areas, lower socioeconomic status, referred from peripheral centers, and traveled a significant distance to reach the tertiary center. Most maternal deaths can be avoided by optimum utilization of existing facilities, generating awareness among the public, and identifying and rectifying the gaps in the health delivery system. Early identification of high-risk pregnancies, timely referral to a tertiary care center, better transportation facilities, periodic training of health care workers, and upgradation of existing hospital set-ups can be a lifesaver. Discrepancies in maternal healthcare delivery, especially to the poorer and rural sections of society, need to be addressed aggressively. These gaps can be effectively bridged with the cooperation and conjoint efforts of all sections of society and professions.

Ethical approval: This study is a retrospective analysis from case records of patients.

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