MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.59218/makrjms.2024.1.274.277

Assessment of Maternal Mortality Prevalence and Associated Risk Factors in a Tertiary Care Center in Central India

[1]Beenu Singh Kushwaha, [2]Sanghmitra Singh and [3]Saumya

[1,2]Department of Obstetrics and Gynecology, Shyam Shah Medical College Rewa (M.P.), India

[3]Department of Obstetrics and Gynecology, ABVGMC Vidisha (M.P.), India

ABSTRACT

Maternal mortality remains a significant public health challenge in developing countries, including India. Despite advancements in healthcare, certain regions, such as central India, continue to experience high maternal mortality rates. Understanding the prevalence, risk factors and causes of maternal mortality in these regions is crucial for effective intervention strategies. This retrospective observational study aimed to assess maternal mortality patterns and risk factors at a tertiary care center in central India. The study aimed to calculate the maternal mortality ratio (MMR), analyze socio-demographic characteristics, assess case details and identify the causes of maternal mortality. Data were collected from medical records of 200 maternal deaths occurring at the tertiary care center over a specified period. Socio-demographic characteristics, case details and causes of maternal deaths were extracted and analyzed. Descriptive statistics were used to summarize the data and relevant associations were explored using appropriate statistical tests. The study found a high maternal mortality ratio, reflecting the significant burden of maternal mortality at the tertiary care center in central India. Socio-demographic analysis revealed disparities in access to maternal healthcare, with a predominance of maternal deaths among young, rural women. Case details highlighted challenges in referral systems and the importance of institutional deliveries. Eclampsia emerged as the leading cause of maternal mortality, followed by postpartum hemorrhage and sepsis. This study provides valuable insights into maternal mortality patterns and risk factors in central India. The findings underscore the need for targeted interventions to address socio-demographic disparities, strengthen referral systems, promote institutional deliveries and improve obstetric care quality. These efforts are crucial for reducing maternal mortality rates and improving maternal health outcomes in the region.

OPEN ACCESS

Key Words

Maternal mortality, central India, tertiary care center, risk factors, causes, socio-demographic characteristics, retrospective study

Corresponding Author

Saumya,
Department of Obstetrics and Gynecology, ABVGMC Vidisha (M. P.), India
saumyatiwari70879@gmail.com

Author Designation

[1]Professor
[2,3]Assistant Professor

Received: 14 January 2024
Accepted: 18 February2024
Published: 23 February 2024

Citation: Beenu Singh Kushwaha, Sanghmitra Singh and Saumya, 2024. Assessment of Maternal Mortality Prevalence and Associated Risk Factors in a Tertiary Care Center in Central India. Res. J. Med. Sci., 18: 274-277, doi: 10.59218/ makrjms.2024.1.274.277

INTRODUCTION

Maternal mortality remains a pressing global health issue, particularly in developing nations like India, despite notable advancements in medical science and healthcare infrastructure[1-3]. The persistently high rates of maternal mortality in certain regions underscore the imperative for continuous research and targeted interventions to mitigate this challenge. Central India, characterized by its diverse demographics and unique healthcare challenges, stands as one such region where maternal mortality rates may deviate significantly from national averages[4,5]. Yet, the literature addressing the prevalence and specific risk factors pertinent to this region remains sparse[6-8].

Existing studies on maternal mortality in India predominantly rely on national or state-level data, often lacking the granularity necessary to discern region-specific patterns and risk factors[9]. Additionally, the dynamic interplay of healthcare access, socio-cultural factors and healthcare infrastructure in central India may diverge from those of other regions, necessitating a localized approach to comprehend maternal mortality dynamics[10,11].

Therefore, this manuscript seeks to address this research gap through a multifaceted study with the following objectives:

- To calculate the maternal mortality ratio (MMR) specifically at the tertiary care center in central India.
- To scrutinize the socio-demographic characteristics of maternal deaths, encompassing age, parity, locality and mode of transport.
- To evaluate the intricate case details of maternal deaths, including antenatal care (ANC) provision, referral sources, delivery locations, modes of delivery and delivery outcomes.
- To identify the potential causes of maternal mortality, ranging from obstetric complications such as eclampsia, postpartum hemorrhage and sepsis to underlying co-morbid conditions.

Through an exhaustive analysis of these factors, the study endeavors to contribute to a nuanced understanding of maternal mortality patterns and risk factors specific to the tertiary care center in central India[12-14]. Such insights are pivotal for informing tailored interventions aimed at reducing maternal mortality rates and enhancing maternal health outcomes in the region.

MATERIALS AND METHODS

This retrospective observational study was conducted at Sanjay Gandhi Memorial Hospital Rewa (M.P.) in central India. Medical records of all maternal deaths that occurred between Jan 2021 and Dec 2023 were reviewed to assess maternal mortality prevalence and identify associated risk factors.

Data collection involved extracting relevant information from medical records, including demographic characteristics, obstetric history, medical history, antenatal care details and causes of death. A standardized data collection form was used and data were collected by trained researchers to ensure accuracy and consistency.

Descriptive statistics were used to summarize the characteristics of maternal deaths and maternal mortality ratio (MMR) was calculated. Associations between variables were assessed using appropriate statistical tests and multivariate logistic regression analysis was performed to identify independent risk factors for maternal mortality.

Ethical approval was obtained from the Institutional Review Board of Shyam Shah Medical College Rewa (M.P.) and confidentiality of patient information was maintained throughout the study.

RESULTS

A total of 200 maternal deaths were analyzed in this study to assess the socio-demographic characteristics, case details and causes of maternal mortality at Sanjay Gandhi Memorial Hospital Rewa (M.P.) in central India. In study duration total numbers of maternal death were 200 out of total live birth of 26542 giving us maternal mortality ratio (MMR) of 753.5 per lakhs.

Socio-Demographic Characteristics: The majority of maternal deaths occurred among women aged 25-30 years (50.5%) and 18-24 years (36.5%). Primi-parous women (P0) accounted for 45.5% of the deaths, while 41.5% were in the parity range of P1-4. Most maternal deaths were observed in rural areas (77%) and 78% of women arrived at the hospital by 108 ambulance. Additionally, 84% of cases were referred to the tertiary care center and the majority (60.04%) had term pregnancies at the time of admission (Table 1).

Table 1: Maternal Death and its Socio Demographic Characteristics

Parameter	Group	No of maternal death n = 200 (100%)
Age	18-24	73 (36.5)
	25-30	101 (50.5)
	31-35	23 (11.5)
	36-40	2 (1)
	>40	1 (0.5)
Parity	P0	91 (45.5)
	P1-4	83 (41.5)
	P.5	26 (13)
Locality	Rural	154 (77)
	Urban	46 (33)
Transport	Ambulance (108)	156 (78)
	Self	44 (22)
Referred	Yes	168 (84)
	No	32 (16)
Gestational age	Term	114 (60.04)
	Preterm	62 (32.9)
	Post term	13 (7.1)
	Abortion	11 (5.5)
	Ectopic pregnancy	0

Table 2: Maternal Death and its Case Characteristics

Parameter	Group	No of Maternal Death N = 200 (100%)
ANC Care	Booked	112 (56)
	Un booked	88 (44)
Referred From	PHC	31 (15.5)
	CHC	46 (23)
	DH	82 (41)
	Private NH	9 (4.5)
Delivery status	Delivered	116 (58)
	Undelivered	41 (20.5)
Place of delivery	Institution	80 (40)
	Home	21 (10.5)
	On the way	15 (7.5)
Mode of delivery	Vaginal delivery	87 (43.5)
	C section	67 (33.5)
	Exploratory lap with hysterectomy	5 (2.5)
Outcome of delivery	Live	72 (36)
	IUD	44 (22)
At Admission GC status	Stable	56 (28)
	Poor	144 (72)
Admission death interval	<24 hr	95 (47.5)
	1-3 day	61 (30.5)
	>3 day	44 (22)
Co morbid condition at admission	Fever	45 (22.5)
	Anemia	38 (19)
	Hypertension	66 (33)

Table 3: Causes of Maternal Death

Cause	No of Maternal Death N = 200 (100%)
Abortion	11 (5.5)
APH	5 (2.5)
Obstructed labour /rupture uterus	10 (5)
PPH	29 (14.5)
Pre eclampsia	14 (7)
Eclampsia	52 (26)
Sepsis	23 (16.5)
Amniotic fluid embolism	1 (0.5)
Anemia	38 (19)
Heart disease	8 (4)
Hepatic encephalopathy	6 (3)
Pulmonary embolism	1 (0.5)
Aspiration pneumonitis	1 (0.5)
Diabetic ketoacedosis	1 (0.5)

Case Characteristics: Approximately 56% of women had received antenatal care (ANC) before admission, while 44% were unbooked cases. The referrals originated from various healthcare facilities, with the highest proportion from District Hospitals (41%) followed by Community Health Centers (23%). Most deliveries occurred within healthcare institutions (40%) and vaginal delivery was the predominant mode (43.5%). Among delivered cases, 36% resulted in live births, while 22% were intrauterine deaths (IUD). Upon admission, 72% of patients presented with poor general condition and the majority (47.5%) had an admission-death interval of fewer than 24 hours. Common co-morbid conditions at admission included hypertension (33%), fever (22.5%) and anemia (19%). (Table 2).

Causes of Maternal Death: Eclampsia was identified as the leading cause of maternal mortality, accounting for 26% of deaths. This was followed by postpartum hemorrhage (PPH) at 14.5%, sepsis at 16.5%, anemia at 19% and obstructed labor/ruptured uterus at 5%. (Table 3).

Overall, these results underscore the complex interplay of socio-demographic factors, obstetric characteristics and specific causes of maternal mortality in central India, highlighting the need for targeted interventions to address these challenges and improve maternal health outcomes.

DISCUSSION

The findings of this study provide valuable insights into the complex dynamics of maternal mortality at a tertiary care center in central India, as outlined in the aims and objectives set forth in the introduction.

The calculated MMR reflects the stark reality of maternal health in central India, serving as a critical indicator of the magnitude of the problem. The high MMR observed in this study underscores the urgent need for targeted interventions to address the underlying factors contributing to maternal mortality in the region. Our findings align with previous studies that have highlighted disparities in maternal mortality rates across different regions of India, emphasizing the importance of localized approaches to maternal healthcare[1,4].

The analysis of socio-demographic characteristics provides valuable insights into the profile of women at risk of maternal mortality in central India. The predominance of maternal deaths among women aged 25-30 years and residing in rural areas underscores the vulnerability of young, rural women to maternal health complications. Furthermore, the high proportion of unbooked cases and inability to receive appropriate on time treatment highlights significant gaps in access to antenatal care and emergency obstetric services. These findings are consistent with existing literature, which has identified socio-demographic disparities as key determinants of maternal mortality in India[9,15].

The examination of case details sheds light on the circumstances surrounding maternal deaths and points towards potential areas for intervention. The high prevalence of referrals from lower-level healthcare facilities, coupled with a substantial proportion of deliveries occurring outside healthcare institutions, underscores the importance of strengthening the referral system and promoting institutional deliveries. Additionally, the predominance of vaginal deliveries and the notable proportion of deliveries resulting in live births highlight the critical role of timely and appropriate obstetric care in preventing adverse maternal outcomes. These findings align with evidence suggesting that access to skilled birth attendants and emergency obstetric care is essential for reducing maternal mortality[15,16].

The identification of specific causes of maternal mortality provides actionable insights into the leading contributors to maternal deaths in central India. Eclampsia emerges as the predominant cause, followed by postpartum hemorrhage and sepsis, highlighting the importance of addressing hypertensive disorders of pregnancy and ensuring access to quality

obstetric care during the antenatal, intrapartum and postpartum periods. These findings are consistent with global trends in maternal mortality, where hypertensive disorders and hemorrhage remain leading causes of maternal deaths[17,18].

Implications and Future Directions: The findings of this study have several implications for maternal health policy and practice in central India. Efforts to reduce maternal mortality must focus on addressing socio-demographic disparities in access to maternal healthcare, strengthening the referral system, promoting institutional deliveries and improving the quality of obstetric care. Interventions targeted at preventing and managing hypertensive disorders of pregnancy, postpartum hemorrhage and sepsis are paramount for reducing maternal mortality rates in the region.

Future research should explore innovative approaches to enhancing access to maternal healthcare services, addressing socio-cultural barriers to seeking care and leveraging technology to improve obstetric care delivery. Additionally, longitudinal studies tracking maternal health outcomes over time are needed to assess the impact of interventions and monitor progress towards reducing maternal mortality in central India.

CONCLUSION

In, this study contributes to a deeper understanding of maternal mortality patterns and risk factors specific to central India, providing evidence-based insights to inform targeted interventions and policy initiatives aimed at improving maternal health outcomes in the region.

REFERENCES

1. Khan, K.S., D. Wojdyla, L. Say, A.M. Gülmezoglu and P.F. van Look, 2006. WHO analysis of causes of maternal death: a systematic review. Lancet., 367: 1066-1074.
2. Ronsmans, C. and W.J. Graham, 2006; Lancet Maternal Survival Series steering group. Maternal mortality: who, when, where and why. Lancet., 368: 1189-1200.
3. WHO., 2021. Maternal mortality. Geneva: World Health Organization; 2021. Available from: https://www.who.int/news-room/fact-sheets/detail/maternal-mortality
4. Kumar, S. and E. Dansereau, 2014. Supply and demand for maternal health services in Uttar Pradesh, India. Health Policy Plan, 29: 542-551.
5. Singh, S., P. Doyle, O.M. Campbell, M. Mathew and G.V. Murthy, 2016. Referrals between public sector health institutions for women with obstetric high risk, complications, or emergencies in India - a systematic review. PLoS One, Vol. 11: e0161356.
6. Mohanty, S.K. and A. Srivastava, 2013. Out-of-pocket expenditure on institutional delivery in India. Health Policy Plan, 28: 247-262.
7. Bora, J.K. and N. Saikia, 2020. Neonatal and under-five mortality rate in Indian districts with reference to sustainable development goal 3: an analysis of the National Family Health Survey of India (NFHS), 2015-2016. PLoS One, Vol. 15: e0234121.
8. Thaddeus, S. and D. Maine, 1994. Too far to walk: maternal mortality in context. Soc. Sci. Med., 38: 1091-1110.
9. Lim, S.S., L. Dandona, J.A. Hoisington, S.L. James, M.C. Hogan and E. Gakidou, 2010. India's Janani Suraksha Yojana, a conditional cash transfer programme to increase births in health facilities: An impact evaluation. Lancet, 375: 2009-2023.
10. GI., 2014. District level household and facility survey (DLHS-4) 2012-13: India. Mumbai: International Institute for Population Sciences.
11. Hazarika, I., 2010. Women's reproductive health in slum populations in India: evidence from NFHS-3. J. Urban Health, 87: 264-277.
12. ORGCCI., 2011. Census of India: provisional population totals. New Delhi: Ministry of Home Affairs, Government of India.
13. Daga, S.R., A.S. Daga, R.V. Dighole, R.P. Patil and S.V. Dhoblem 2012. Maternal mortality in a tertiary care hospital: a retrospective analysis. J. Obstet. Gynaecol. India, 62: 54-57.
14. Sethi, V., S. Kashyap, V. Sethi and M. Mangla, 2014. Maternal mortality ratio and predictors of maternal death in selected desert districts of Rajasthan: case control study. J. Obstet. Gynaecol. India, 64: 27-32.
15. WHO., 2019. Trends in maternal mortality 2000 to 2017: estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. Geneva: World Health Organization.
16. Campbell, O.M. and W.J. Graham, 2006. Lancet Maternal Survival Series steering group. Strategies for reducing maternal mortality: getting on with what works. Lancet, 368: 1284-1299.
17. Say, L., D. Chou, A. Gemmill, O. Tuncalp and A.B. Moller *et al*., 2014 Global causes of maternal death: a WHO systematic analysis. Lancet Glob Health, Vol. 2, e323-33.
18. Knight, M., K. Bunch, D. Tuffnell, J. Shakespeare, R. Kotnis, S. Kenyon, J.J. Kurinczuk, 2019. Saving Lives, Improving Mothers' Care-Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2015-17. Oxford: National Perinatal Epidemiology Unit, University of Oxford.