Section: Obstetrics and Gynaecology

Original Research Article

DETERMINING ETIOLOGY AND MANAGEMENT OF MATERNAL NEAR-MISS IN A TERTIARY CARE CENTER IN THRISSUR

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ABSTRACT

Background: Maternal near-miss (MNM) cases, which involve women who survive severe pregnancy-related complications, provide critical insights into maternal health care quality. This study aims to analyze the etiology and management of MNM in a tertiary care setting in Thrissur, Kerala, over a one-year period.

Materials and Methods: A retrospective observational study was conducted on MNM cases admitted to the Jubilee Mission Medical College from January to December 2023. Data were collected from hospital records, including patient demographics, clinical presentations, comorbidities, and interventions. Statistical analyses, including chi-square and T-tests, were performed to determine associations between variables.

Results: Out of 50 cases reviewed, hemorrhage (42%) and hypertensive disorders (30%) were the primary causes of MNM. Most cases occurred in late preterm to term gestational ages, with 74% referred from other centers. Significant associations were noted between young age, late gestational age, and the necessity of ICU care. Management strategies varied by case complexity and included massive blood transfusions and emergency hysterectomies.

Conclusion: Hemorrhage and hypertensive disorders are the leading causes of MNM. Improving early identification, strengthening primary and secondary care, and ensuring prompt referrals are essential for reducing severe maternal morbidity.

Keywords: Maternal near-miss, hemorrhage, hypertensive disorders, tertiary care, multidisciplinary approach.

INTRODUCTION

Maternal near-miss (MNM) has emerged as a critical measure for understanding maternal health outcomes, particularly in low- and middle-income countries where maternal mortality rates remain high.[1] The World Health Organization (WHO) defines MNM as an event in which a woman nearly dies but survives a life-threatening complication during pregnancy, childbirth, or within 42 days after the termination of pregnancy.[2] Unlike maternal mortality, MNM cases provide an opportunity to examine severe obstetric complications that could have resulted in death but were successfully managed due to timely intervention. Thus, MNM serves as a practical and informative proxy for studying conditions and health system factors that contribute to severe maternal morbidity and, ultimately, maternal mortality.[3]

Global efforts to reduce maternal mortality have shown positive outcomes in high-income countries, where comprehensive obstetric care, accessible emergency services, and advanced health infrastructures support maternal health. However, in

countries like India, where maternal mortality remains high despite improvements, the focus has shifted toward understanding MNM cases to identify gaps in care that lead to critical, near-fatal complications. MNM studies are especially important in regions with limited resources, as they can highlight areas of weakness within the healthcare system, including delays in accessing care, inadequate emergency management, and barriers to timely referral.[4-7]

In India, the maternal mortality ratio (MMR) has decreased over recent decades due to better healthcare infrastructure, government interventions, and awareness campaigns. However, maternal health disparities persist, particularly in rural and semi-urban areas. As MNM cases are more frequent than maternal deaths, they provide a richer dataset to analyze factors that influence maternal health outcomes. For instance, maternal near-miss cases can reveal information on the quality of emergency obstetric services, the preparedness of healthcare facilities, and the effectiveness of referral systems. In 2014, the Ministry of Health and Family Welfare of India introduced guidelines for MNM case reviews to enhance understanding of maternal health needs and improve obstetric care across various healthcare levels. These guidelines initially targeted tertiary care centers and are gradually expanding to district hospitals and first referral units.[8]

Despite these advancements, several challenges remain in India, including under-reporting of MNM cases, limited resources, and inconsistent adherence to guidelines in primary and secondary healthcare facilities. MNM data is often lacking in comprehensiveness, and there is a need for systematic reviews of MNM cases to enable a more consistent approach to improving maternal health services.[9] Understanding the causes and management outcomes of MNM cases can guide corrective actions at all levels of healthcare, especially in tertiary care centers that receive the most severe cases. This focus on MNM is particularly relevant in states like Kerala, where healthcare infrastructure is advanced relative to other parts of the country, yet the state still faces challenges in optimizing maternal health outcomes due to high patient influx and resource constraints.[10]

Aims and Objectives

1. To document the frequency and nature of maternal near-miss cases in a tertiary care setting in Thrissur.
2. To analyze the etiological factors associated with MNM, including demographic variables, obstetric history, and comorbid conditions.
3. To evaluate the different management options employed for MNM cases and assess their effectiveness in preventing maternal mortality.
4. To identify gaps in the care pathways, including referral and emergency interventions, to provide recommendations for improving maternal health services at tertiary and other healthcare levels.

MATERIALS AND METHODS

Study Design

This retrospective observational study was conducted in the Obstetrics and Gynecology Department of Jubilee Mission Medical College, Thrissur.

Study Population

The study population included all maternal near-miss cases admitted from January to December 2023. A sample of 50 cases meeting the maternal near-miss criteria was analyzed.

Inclusion Criteria

Women classified as MNM according to the Kerala Federation of Obstetrics and Gynecology (KFOG) near-miss criteria were included in the study.

Data Collection

Data were gathered from the hospital's near-miss register and patient records. Key variables included age, gestational score, comorbidities, mode of delivery, ICU admission, diagnosis, and treatment methods.

Data Analysis

The data were organized in Excel and analyzed using SPSS version 25. Age, a parametric variable, was analyzed using a one-sample T-test, while chi-square tests were applied to categorical variables. Statistical significance was set at $p < 0.05$.

RESULTS

The results present the demographic distribution, primary causes of MNM, and management strategies applied.

The analysis of age groups in MNM cases shows that younger women (under 30) have a higher frequency of MNM cases, highlighting a need for targeted support for younger mothers. [Table 1]

Analysis of gestational age among MNM cases indicates the highest incidence during late preterm and term periods (33–40 weeks). This suggests that closer monitoring in these stages may be essential for timely intervention. [Table 2]

The high referral rate of 74% indicates the need for improved primary and secondary care systems to reduce maternal morbidity. [Table 3]

The prevalence of hypertensive disorders among MNM cases is significant, accounting for 34% of comorbidities. This suggests a need for better hypertension management strategies in maternal care. [Table 4]

Hemorrhage (42%) and severe hypertension/eclampsia (30%) are the leading causes, underscoring the need for effective hemorrhage management protocols. [Table 5]

Management data show that the most common intervention was massive blood transfusion (36%), followed by emergency hysterectomy (20%).

Table 1: Age Distribution

Age Group	Percentage (%)	P Value
18-25	38	0.0001
26-30	28	
31-35	18	
36-40	6	-
>40	10	-

Table 2: Gestational Age Distribution

Gestational Age	Frequency	Percentage (%)	P Value
<8 weeks	3	6	0.0001
9-16 weeks	1	2	
17-24 weeks	6	12	
25-32 weeks	7	14	
33-40 weeks	20	40	
Postpartum	13	26	

Table 3: Referral Status

Source	Frequency	Percentage	P Value
Inpatient	13	26	0.0001
Referral	37	74	

Table 4: Comorbidities

Comorbidity	Frequency	Percentage (%)	P Value
Hypertensive Disorders	17	34	0.0001
Diabetes	4	8	
Placental Causes	8	16	
Twin Pregnancy	4	8	
Gestational Thrombocytopenia	2	4	
Seizure Disorder	2	4	
Other	6	12	
Nil	14	28	

Table 5: Primary Causes of Near-Miss

Cause	Number	Percentage (%)
Hemorrhage	21	42
Severe Hypertension/Eclampsia	15	30
Sepsis	8	16
AFLP/Liver Dysfunction	1	2
Renal	3	6
Blood Disorders	2	4
Cardiorespiratory Arrest	2	4
Cerebral Hemorrhage	2	4

Table 6: Management Interventions

Intervention	Frequency	Percentage (%)
Massive Blood Transfusion	18	36
Elective LSCS + Uterine Artery Lig	4	8
Aortic Clamp	8	16
Emergency Hysterectomy	10	20
Dialysis	3	6
Laparotomy	12	24
Antibiotics	4	8

DISCUSSION

This study highlights the high prevalence of maternal near-miss cases in young women, particularly in late preterm and term pregnancies. Hemorrhage and hypertensive disorders emerged as the primary contributors, consistent with global data on maternal morbidity.[9-12] The high incidence of referrals suggests that primary and secondary care levels need enhanced screening and rapid intervention mechanisms to prevent complications.[11]

Efforts to prevent hemorrhage and manage hypertension earlier in pregnancy could substantially reduce MNM rates. Implementing mandatory protocols such as Active Management of the Third Stage of Labor (AMTSL) and earlier initiation of hypertensive management at primary health levels would be critical steps forward. These cases emphasize the role of comprehensive obstetric care and the necessity of multi-disciplinary management to address severe complications, including prompt blood transfusions, surgical interventions, and intensive care.[12,13]

CONCLUSION

Maternal near-miss cases predominantly arise from preventable causes such as hemorrhage and hypertension. Effective management requires coordinated antenatal care, early diagnosis, and the implementation of intervention protocols across health care levels. Improvements in referral systems, training for primary health centers, and adherence to MNM guidelines are essential to decrease maternal morbidity.

REFERENCES

1. Oyelese Y, Ananth CV. Placental abruption. Obstet Gynecol. 2006 Oct;108(4):1005-16. doi: 10.1097/01.AOG.0000239439.04364.9a. PMID: 17012465.
2. Bussel JB, Vander Haar EL, Berkowitz RL. New developments in fetal and neonatal alloimmune thrombocytopenia. Am J Obstet Gynecol. 2021 Aug;225(2):120-127. doi: 10.1016/j.ajog.2021.04.211. Epub 2021 Apr 8. PMID: 33839095.
3. Cheong-See F, Schuit E, Arroyo-Manzano D, Khalil A, Barrett J, Joseph KS, Asztalos E, Hack K, Lewi L, Lim A, Liem S, Norman JE, Morrison J, Combs CA, Garite TJ, Maurel K, Serra V, Perales A, Rode L, Worda K, Nassar A, Aboulghar M, Rouse D, Thom E, Breathnach F, Nakayama S, Russo FM, Robinson JN, Dodd JM, Newman RB, Bhattacharya S, Tang S, Mol BW, Zamora J, Thilaganathan B, Thangaratinam S; Global Obstetrics Network (GONet) Collaboration. Prospective risk of stillbirth and neonatal complications in twin pregnancies: systematic review and meta-analysis. BMJ. 2016 Sep 6;354:i4353. doi: 10.1136/bmj.i4353. PMID: 27599496; PMCID: PMC5013231.
4. Beaumont RN, Flatley C, Vaudel M, Wu X, Chen J, Moen GH, Skotte L, Helgeland Ø, Solé-Navais P, Banasik K, Albiñana C, Ronkainen J, Fadista J, Stinson SE, Trajanoska K, Wang CA, Westergaard D, Srinivasan S, Sánchez-Soriano C, Bilbao JR, Allard C, Groleau M, Kuulasmaa T, Leirer DJ, White F, Jacques PÉ, Cheng H, Hao K, Andreassen OA, Åsvold BO, Atalay M, Bhatta L, Bouchard L, Brumpton BM, Brunak S, Bybjerg-Grauholm J, Ebbing C, Elliott P, Engelbrechtsen L, Erikstrup C, Estarlich M, Franks S, Gaillard R, Geller F, Grove J, Hougaard DM, Kajantie E, Morgen CS, Nohr EA, Nyegaard M, Palmer CNA, Pedersen OB; Early Growth Genetics (EGG) Consortium; Rivadeneira F, Sebert S, Shields BM, Stoltenberg C, Surakka I, Thørner LW, Ullum H, Vaarasmaki M, Vilhjalmsson BJ, Willer CJ, Lakka TA, Gybel-Brask D, Bustamante M, Hansen T, Pearson ER, Reynolds RM, Ostrowski SR, Pennell CE, Jaddoe VWV, Felix JF, Hattersley AT, Melbye M, Lawlor DA, Hveem K, Werge T, Nielsen HS, Magnus P, Evans DM, Jacobsson B, Järvelin MR, Zhang G, Hivert MF, Johansson S, Freathy RM, Feenstra B, Njølstad PR. Genome-wide association study of placental weight identifies distinct and shared genetic influences between placental and fetal growth. Nat Genet. 2023 Nov;55(11):1807-1819. doi: 10.1038/s41588-023-01520-w. Epub 2023 Oct 5. PMID: 37798380; PMCID: PMC10632150.
5. Finucane EM, Murphy DJ, Biesty LM, Gyte GM, Cotter AM, Ryan EM, Boulvain M, Devane D. Membrane sweeping for induction of labour. Cochrane Database Syst Rev. 2020 Feb 27;2(2):CD000451. doi: 10.1002/14651858.CD000451.pub3. PMID: 32103497; PMCID: PMC7044809.
6. Nansubuga E, Ayiga N, Moyer CA. Prevalence of maternal near miss and community-based risk factors in Central Uganda. Int J Gynaecol Obstet. 2016 Nov;135(2):214-220. doi: 10.1016/j.ijgo.2016.05.009. Epub 2016 Aug 1. PMID: 27553504.
7. Miller J, Turan S, Baschat AA. Fetal growth restriction. Semin Perinatol. 2008 Aug;32(4):274-80. doi: 10.1053/j.semperi.2008.04.010. PMID: 18652928.
8. Cunha ACMC, Katz L, Amorim AFC, Coutinho IC, Souza AS, Katz S, Souza G, Souza G, Farias L, Lemos R, Mello MZ, Neves L, Albuquerque M, Feitosa FE, Paiva J, Lima C, Lima M, Amorim MM; Northeastern Brazilian Study Group on COVID-19 and Pregnancy (N-COVIP). Clinical, epidemiological and laboratory characteristics of cases of Covid-19-related maternal near miss and death at referral units in northeastern Brazil: a cohort study. J Matern Fetal Neonatal Med. 2023 Dec;36(2):2260056. doi: 10.1080/14767058.2023.2260056. Epub 2023 Sep 25. PMID: 37748920.
9. Chaurasia S, Ramappa M, Ashar J, Sharma S. Neonatal infectious keratitis. Cornea. 2014 Jul;33(7):673-6. doi: 10.1097/ICO.0000000000000138. PMID: 24858018.
10. De Mucio B, Abalos E, Cuesta C, Carroli G, Serruya S, Giordano D, Martinez G, Sosa CG, Souza JP; Latin American Near Miss Group (LANe-MG). Maternal near miss and predictive ability of potentially life-threatening conditions at selected maternity hospitals in Latin America. Reprod Health. 2016 Nov 4;13(1):134. doi: 10.1186/s12978-016-0250-9. PMID: 27814759; PMCID: PMC5097347.
11. Teshome HN, Ayele ET, Hailemeskel S, Yimer O, Mulu GB, Tadese M. Determinants of maternal near-miss among women admitted to public hospitals in North Shewa Zone, Ethiopia: A case-control study. Front Public Health. 2022 Aug 25; 10:996885. doi: 10.3389/fpubh.2022.996885. PMID: 36091552; PMCID: PMC9452817.
12. Liyew EF, Yalew AW, Afework MF, Essén B. Maternal near-miss and the risk of adverse perinatal outcomes: a prospective cohort study in selected public hospitals of Addis Ababa, Ethiopia. BMC Pregnancy Childbirth. 2018 Aug 22;18(1):345. doi: 10.1186/s12884-018-1983-y. PMID: 30134858; PMCID: PMC6106830.
13. Dilli D, Soylu H, Tekin N. Neonatal hemodynamics and management of hypotension in newborns. Turk Pediatri Ars. 2018 Dec 25;53(Suppl 1):S65-S75. doi: 10.5152/TurkPediatriArs.2018.01801. PMID: 31236020; PMCID: PMC6568285.