https://doi-ds.org/doilink/05.2025-61413534/GIJNR
Glorious International Journal of Nursing Research
(An International Peer-Reviewed Refereed Journal)
ISSN: 2583-9713 www.gloriousjournal.com

ECMO in pregnant and postpartum women – a lifesaving procedure

Ms. Siji Varghese[1], Riya Vaghela[2], Suchanda Devi[3], Thakor Pritesh[4]

1. Clinical Instructor, Parul Institute of Nursing, Parul University, Vadodara, Gujarat, India
2-4. Post Basic B.Sc. Nursing Students, Parul institute of Nursing, Parul university, Vadodara, Gujarat, India

Corresponding Author: Siji Varghese Email: siji.varghese26828@paruluniversity.ac.in

Article Information:

Type of Article: Original Article **Received On:** 05/05/2025

Accepted On: 11/05/2025 **Published On**: 23/05/2025

Abstract: Extracorporeal Membrane Oxygenation (ECMO) is an advanced life-support technique that provides temporary cardiac and respiratory support to patients with severe cardiopulmonary failure. Its use in pregnant and postpartum women is growing, particularly in cases where conventional therapies fail to stabilize the maternal condition. Conditions such as acute respiratory distress syndrome (ARDS), peripartum cardiomyopathy, pulmonary embolism, and amniotic fluid embolism can lead to life-threatening complications during pregnancy and the postpartum period. In such scenarios, ECMO offers a critical bridge to recovery or definitive treatment, improving maternal survival rates significantly. Despite the inherent risks to both mother and fetus, including hemorrhage, thrombosis, and preterm birth, studies report maternal survival rates between 77% to 90%, and fetal survival rates ranging from 65% to 83%. Managing ECMO in obstetric patients requires careful consideration of physiological changes in pregnancy, ethical concerns, and multidisciplinary collaboration among obstetricians, intensivists, neonatologists, and cardiologists. Timely initiation and individualized care protocols are key to optimizing outcomes. This review compiles current evidence on ECMO application in obstetrics, emphasizing its indications, outcomes, complications, and clinical considerations. It underlines the need for continued research and standardized guidelines to ensure safe and effective ECMO use in maternal critical care settings.

Keywords: ECMO, Pregnancy, Postpartum, Cardiopulmonary failure, Multidisciplinary care, Maternal outcomes.

https://doi-ds.org/doilink/05.2025-61413534/GIJNR
Glorious International Journal of Nursing Research
(An International Peer-Reviewed Refereed Journal)
ISSN: 2583-9713 www.gloriousjournal.com

Introduction:

Pregnancy is accompanied by profound physiological changes, particularly in the cardiovascular and respiratory systems, to support fetal development. While most women adapt to these changes, a subset may develop severe complications such as acute respiratory distress syndrome (ARDS), peripartum cardiomyopathy (PPCM), pulmonary embolism, or amniotic fluid embolism (AFE), which can result in rapid cardiopulmonary deterioration. In these life-threatening scenarios, conventional medical therapies may be insufficient to sustain maternal or fetal life. Extracorporeal Membrane Oxygenation (ECMO) has emerged as a vital, last-resort intervention that provides temporary support for gas exchange and/or cardiac function in critically ill patients. Though originally developed for non-pregnant populations, ECMO is increasingly applied in obstetric care due to its ability to improve maternal survival outcomes. However, its use in pregnancy and the postpartum period presents unique challenges, including altered maternal physiology, fetal considerations, ethical dilemmas, and potential complications. A multidisciplinary approach involving obstetrics, critical care, neonatology, and cardiology is essential for the safe implementation of ECMO in this population. This review explores the current evidence on ECMO in pregnant and postpartum women, discussing its indications, outcomes, risks, and management strategies to inform clinical practice and enhance maternal-fetal care.

Methodology:

This review synthesizes data from systematic reviews, case series, and retrospective studies published between 2000 and 2023. The literature was collected through database searches, including PubMed and ClinicalTrials.gov, focusing on ECMO use in pregnancy and postpartum cases.

Indications for ECMO in Pregnancy and Postpartum:

Maternal Indications:

- Severe ARDS
- Peripartum cardiomyopathy
- Pulmonary embolism
- Eclampsia-related complications
- Postpartum hemorrhage-induced cardiopulmonary collapse

Fetal Indications (Neonatal ECMO):

- Congenital diaphragmatic hernia
- Meconium aspiration syndrome
- Persistent pulmonary hypertension of the newborn (PPHN)
- Neonatal sepsis with septic shock

https://doi-ds.org/doilink/05.2025-61413534/GIJNR
Glorious International Journal of Nursing Research
(An International Peer-Reviewed Refereed Journal)
ISSN: 2583-9713 www.gloriousjournal.com

Outcomes and Survival Rates:

A consistent finding across studies is the high maternal survival rate associated with ECMO (approximately 77–90%). Fetal survival, though lower (65–70%), remains promising. For example:

- Ong et al. (2020) reported 90.7% maternal and 83.3% neonatal survival.
- Palella et al. (2023) observed 80% maternal and 67.9% fetal survival in a review of 306 cases.
- ECMO was especially successful in COVID-19-related ARDS cases, as highlighted by Clemenza et al. (2023).

Challenges and Considerations:

1. Physiological Changes:

Pregnancy involves increased cardiac output and oxygen consumption, which complicates ECMO management. Cannulation, anticoagulation, and flow parameters must be tailored accordingly.

2. Maternal-Fetal Balance:

Management must weigh maternal benefits against fetal risks. Decisions regarding ECMO initiation or withdrawal should consider gestational age, fetal viability, and maternal prognosis.

3. Ethical Dilemmas:

Complex cases may raise ethical concerns regarding fetal viability, informed consent, and resource allocation, necessitating interdisciplinary consultation.

4. Complications:

- Maternal: Hemorrhage, thrombosis, infection, multi-organ dysfunction
- Fetal: Preterm birth, hypoxia, neurodevelopmental risks

Multidisciplinary Management:

Optimal outcomes demand collaboration between critical care, obstetrics, neonatology, cardiology, and ethics specialists. Regular fetal monitoring, individualized weaning strategies, and postpartum care coordination are essential.

Conclusion:

ECMO represents a viable, often lifesaving intervention for pregnant and postpartum women experiencing refractory cardiopulmonary failure. Although not without significant risks, especially to the fetus, careful patient selection, timely intervention, and expert multidisciplinary care significantly improve outcomes. Continued research, standardized protocols, and data collection are essential to refine ECMO's role in obstetric care.

https://doi-ds.org/doilink/05.2025-61413534/GIJNR
Glorious International Journal of Nursing Research
(An International Peer-Reviewed Refereed Journal)
ISSN: 2583-9713 www.gloriousjournal.com

References:

1. Lewandowski, K. (2000). Extracorporeal membrane oxygenation for severe acute respiratory failure. Critical Care, 4(3), 156–168. https://doi.org/10.1186/cc689
2. Asfaw, R. A. (2024, June 17). Physiological changes during pregnancy. MedReport Foundation.
3. Martins Costa, A., et al. (2022). Trends, advantages and disadvantages in combined extracorporeal lung and kidney support from a technical point of view. Frontiers in Medical Technology, 4, 909990. https://doi.org/10.3389/fmed.2022.909990
4. Dutta, S., Hirani, S., Heda, A., Shaikh, M. Y. D., Washani, S., Hirani, S., Prasad, R., & Wanjari, M. (2023). Extracorporeal membrane oxygenation (ECMO): A lifeline for pregnant and postpartum women.
5. Ong, J., Zhang, J. J. Y., Lorusso, R., MacLaren, G., & Ramanathan, K. (2020). Extracorporeal membrane oxygenation in pregnancy and the postpartum period: A systematic review of case reports.
6. Wong, M. J., Kodali, B. S., & Rex, S. (2021). Extracorporeal membrane oxygenation and pregnancy.
7. Fuhrmann, M. E., et al. (2022). Management of severe acute respiratory distress syndrome in a pregnant patient due to COVID-19 with ECMO.
8. Webster, C. M., Smith, K. A., & Manuck, T. A. (2021). Extracorporeal membrane oxygenation in pregnant and postpartum women: A ten-year case series.
9. Wong, M. J., Bharadwaj, S., Galey, J. L., Lankford, A. S., Galvagno, S., & Kodali, B. S. (2022). Extracorporeal membrane oxygenation for pregnant and postpartum patients.
10. Pacheco, L. D., Saade, G. R., & Hankins, G. D. V. (2021). Extracorporeal membrane oxygenation (ECMO) during pregnancy and postpartum.
11. Naoum, E. E., et al. (2022). Extracorporeal life support in pregnancy: A systematic review.
12. Romenskaya, T., Longhitano, Y., Mahajan, A., Savioli, G., Voza, A., Tesauro, M., & Zanza, C. (2023). Extra-corporeal membrane oxygenation in pregnancy.
13. Makdisi, G., & Wang, I. (2020). Extra corporeal membrane oxygenation (ECMO): Review of a lifesaving technology.
14. Sharma, N. S., Wille, K. M., Bellot, S. C., & Diaz, E. (2021). Modern use of extracorporeal life support in pregnancy and postpartum.
15. Moore, S. A., Dietl, C. A., & Coleman, D. M. (2020). Extracorporeal life support during pregnancy.