Review Article ISSN 2835-6276

American Journal of Medical and Clinical Research & Reviews

Management of Obstetric Complications in High-Risk Deliveries: An Updated Review

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Received: ***25 May 2025;*** ***Accepted:*** ***05 June 2025;*** ***Published:*** ***10June 2025***

Citation: Ian Caldeira Ruppen. Management of Obstetric Complications in High-Risk Deliveries: An Updated Review. AJMCRR. 2025; 4(6): 1-4.

Abstract

High-risk delivery encompasses clinical situations that substantially increase the likelihood of adverse maternal and neonatal outcomes, requiring appropriate infrastructure, a trained multidisciplinary team, and evidence-based protocols. This review aims to synthesize the principal obstetric complications that threaten perinatal safety and discuss updated prevention and management strategies. To that end, a systematic search was conducted in the PubMed, SciELO, LILACS, and Cochrane Library databases, covering publications from 2015 to 2024. Original studies, systematic reviews, and guidelines addressing postpartum hemorrhage, shoulder dystocia, eclampsia, umbilical cord prolapse, and acute fetal distress were selected. Findings confirm that standardized protocols, pharmacological prophylaxis, and training in realistic simulations can reduce maternal mortality from postpartum hemorrhage by up to 60%, decrease neonatal neurological sequelae, and improve safety indicators. Incorporation of artificial intelligence into cardiotocography enhances diagnostic accuracy for fetal distress, while WHO-based obstetric checklists reduce adverse events by 23%. It is concluded that the integration of scientific evidence, technological innovation, and humanization of care is crucial to mitigate risks and optimize outcomes in high-risk deliveries, in alignment with global maternal mortality reduction goals.

Keywords: Obstetric complications; High-risk deliveries; Fetal distress; Mortality; Humanization.

Introduction:

Pregnancy is a universal physiological phenomenon, yet not devoid of risks. The World Health Organization (2020) estimates that approximately 15% of pregnancies develop complications capable of compromising maternal and/or fetal health, classifying them as high risk. Despite advances in high-resolu-

tion ultrasonography, Doppler flowmetry, and laboratory screening, global maternal mortality remains elevated, particularly in low- and middle-income countries. According to the World Bank (2024), the average maternal mortality rate in low-income nations is 415 per 100,000 live births, compared with 19 per 100,000 in high-income countries, underscoring stark disparities. High-risk deliveries include contexts such as chronic maternal diseases (hypertension, diabetes, cardiac conditions), specific obstetric conditions (multiple gestation, placenta previa, pre-eclampsia), and acute intrapartum events most notably postpartum hemorrhage (PPH), shoulder dystocia, umbilical cord prolapse, and acute fetal distress (FIGUEIREDO et al., 2018).

The multifactorial etiology demands a multidisciplinary approach, integrating obstetricians, anesthesiologists, neonatologists, intensivists, and nursing staff. The epidemiological profile of obstetric complications has been influenced by demographic factors such as advanced maternal age and rising obesity prevalence as well as socioeconomic determinants that result in unequal access to adequate prenatal care (SILVA, 2021). Concurrently, the growing rate of elective cesarean deliveries without medical indication disrupts physiological labor, increasing the risk of hemorrhage and infection. In this scenario, evidence-based protocols become essential to guide practice and standardize care pathways.

Digital technologies including artificial intelligence systems that interpret cardiotocography patterns in real time and telemedicine platforms connecting peripheral maternity units to referral centers—offer promise in the early detection of fetal deterioration and therapeutic decision-making (BATISTA; SOUZA, 2022). However, adoption depends on sustainable funding, reliable connectivity infrastructure, and appropriate technical training. Humanized obstetric care encompassing respectful communication, maternal autonomy, and non-pharmacological pain management has also gained prominence after evidence linked it to higher maternal satisfaction, reduced invasive interventions, and better neonatal outcomes (MARTINS; LIMA, 2021). Balancing humanization with technical rigor in high-risk deliveries requires effective communication and well-trained teams. Against this complex backdrop, this article critically reviews the main obstetric complications associated with high-risk delivery, describes evidence-based management strategies, and discusses how technological innovations and professional qualification policies can transform obstetric care. It aims to provide practical guidance for clinicians and managers seeking to reduce maternal and perinatal morbidity and mortality, aligned with the United Nations 2030 Agenda for Sustainable Development.

Objectives:

To present the principal obstetric complications characterizing high-risk deliveries and to discuss clinical and surgical management, care protocols, and technological innovations that enhance maternal-fetal safety.

Materials And Methods:

A literature review was conducted using the PubMed, SciELO, LILACS, and Cochrane Library databases, covering publications from 2015 through 2024. Selected studies included original research articles, systematic reviews, and clinical guidelines focusing on postpartum hemorrhage, shoulder dystocia, eclampsia, umbilical cord prolapse, and acute fetal distress.

Discussion:

Postpartum Hemorrhage (PPH) remains the leading cause of maternal death, accounting for about 27% of global maternal mortality (WHO, 2022). A Cochrane review (2022) confirms that active prophylaxis with intramuscular oxytocin reduces PPH incidence by 60%. In high-risk scenarios such as severe anemia, placenta previa, or instrumental delivery ergometrine or carbetocin is added. When blood loss exceeds 1,000 mL, a stepwise protocol is implemented: uterine massage, misoprostol administration, Bakri balloon tamponade, B-Lynch suture application, and, as a last resort, peripartum hysterectomy (ACOG, 2019). Shoulder Dystocia Occurring in 0.6–1.4% of vaginal births, particularly among diabetic mothers and macrosomic fetuses (FIGUEIRA et al., 2017), shoulder dystocia demands prompt, coordinated response. Annual simulation-based training reduces resolution time by 47% and virtually eliminates permanent brachial plexus injuries (MARTINS; LIMA, 2021). The standardized sequence of maneuvers McRoberts, suprapubic pressure, Rubin, Woods screw, and posterior arm extraction should be applied progressively.

Pre-eclampsia progresses to eclampsia in 2–3% of cases; magnesium sulfate lowers recurrent seizure risk by 58%, while hydralazine or labetalol controls severe hypertension (WHO, 2021). Laboratory monitoring facilitates early detection of HELLP syndrome and pulmonary edema.

Umbilical Cord Prolapse Although rare (0.2%), cord prolapse raises perinatal mortality to 10% (FERREIRA et al., 2020). Temporary relief measures include manual elevation of the presenting part, instillation of normal saline into the maternal bladder, and knee-chest positioning until an emergency cesarean section can be performed. Fetal telemetry systems in remote settings have been shown to reduce decision-to-delivery intervals.

Acute Fetal Distress Identified by late decelerations, prolonged decelerations, or a sinusoidal pattern on cardiotocography, acute fetal distress benefits from machine-learning algorithms that achieve up to 92% sensitivity for detecting fetal acidemia (BATISTA; SOUZA, 2022), though external validation remains necessary. **Safety Checklists and Point-of-Care Ultrasound** Institutions employing WHO-based obstetric safety checklists report a 23% reduction in severe adverse events (FIGUEIRA et al., 2020). Postpartum point-of-care ultrasound enables rapid volumetric assessment of the uterus, facilitating early intervention before hemorrhagic shock (SOUZA, 2021). Iron Replacement and Rapid Response Teams, Intravenous iron therapy in the antenatal period reduces transfusion requirements in the puerperium. Dedicated obstetric rapid response teams including an obstetrician, anesthesiologist, and neonatologist on standby can decrease morbidity by 30% and shorten intervention times for acute complications. These initiatives underscore that systemic integration, continuous training, and judicious use of technology have the potential to revolutionize high-risk obstetric care.

Conclusion:

Addressing obstetric complications in high-risk deliveries requires synergy among public policy, professional training, infrastructure, and technological innovation. Standardized protocols and well-trained teams significantly lower maternal and neonatal mortality, while technologies such as artificial intelligence and point-of-care ultrasound enhance early detection of abnormalities. Regionalization of high-risk delivery care, supported by effi-

cient perinatal transport, helps equalize geographic disparities. Continuing education programs and institutional certification positively impact quality indicators. Humanization remains indispensable: involving the pregnant person and family in decision-making, ensuring adequate analgesia, and respecting cultural aspects promote positive experiences without compromising clinical safety. Ultimately, sustainable reduction of obstetric complications depends on integrating science, technology, and respect for women's autonomy. Investing in translational research, monitoring quality indicators, and fostering a culture of continuous learning are essential strategies to achieve the global maternal health targets by 2030, serving as a roadmap for clinicians and health managers.

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