

# Placental Factors and Maternal Health Optimization of Intrauterine Growth Restriction

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## ABOUT THE STUDY

Intrauterine Growth Restriction (IUGR) is a significant condition affecting fetal growth, defined as a fetal weight below the 10th percentile for gestational age. This condition implies that the fetus is not growing as expected in the womb, which can have serious implications for both short-term and long-term health outcomes. Intrauterine growth restriction is associated with increased risks of perinatal morbidity and mortality, as well as chronic health conditions later in life.

### Fetal factors

It plays an important role in determining the growth and development of a fetus. These factors can contribute significantly to conditions such as Intrauterine Growth Restriction (IUGR), where the fetus does not grow as expected. Fetal growth is influenced by genetic makeup, chromosomal abnormalities, multiple gestations, and fetal infections. Genetic factors are fundamental in shaping fetal growth potential. Each fetus inherits a unique combination of genes from both parents, which dictates various growth parameters, including size and rate of development. Genetic disorders can lead to growth abnormalities, as seen in conditions like Down syndrome, Turner syndrome, and other chromosomal anomalies. These conditions can impair cellular processes essential for normal growth, leading to a smaller-than-expected fetus for gestational age.

Chromosomal abnormalities can also significantly affect fetal growth. Abnormalities in the number or structure of chromosomes can lead to developmental delays and physical malformations. For example, trisomy 21 (Down syndrome) results from an extra chromosome 21 and is associated with distinctive facial features, congenital heart defects, and growth delays. Turner syndrome, a condition where a female is partly or completely missing an X chromosome, can also result in growth restriction and other health issues. These chromosomal conditions are often diagnosed through prenatal screening and

diagnostic tests such as amniocentesis and Chorionic Villus Sampling (CVS).

### Placental factors

It plays an important role in fetal growth and development, acting as the important interface between the mother and fetus. The placenta is responsible for the exchange of nutrients, gases, and waste products, as well as the production of hormones necessary for maintaining pregnancy. When placental function is compromised, it can lead to conditions such as Intrauterine Growth Restriction (IUGR), where the fetus does not grow at the expected rate. One of the primary placental factors affecting fetal growth is placental insufficiency.

Placental abruption is another significant placental factor impacting fetal growth. This condition involves the premature separation of the placenta from the uterine wall, which can disrupt the supply of oxygen and nutrients to the fetus. Depending on the severity of the abruption, it can cause significant fetal distress and growth restriction. Placental abruption can result from trauma, high blood pressure, or substance abuse during pregnancy. Management often involves close monitoring and, in severe cases, immediate delivery to ensure the safety of both the mother and the fetus.

### Ultrasound

It is a non-invasive imaging technique that uses high-frequency sound waves to create real-time images of structures within the body. In obstetrics, ultrasound is essential for monitoring fetal development, diagnosing conditions like intrauterine growth restriction, and assessing amniotic fluid levels and placental health. It involves a transducer emitting sound waves that bounce off tissues, producing echoes that are converted into visual images on a screen. Ultrasound can measure fetal biometry, including head circumference, abdominal circumference, and femur length, helping estimate fetal weight and growth. Doppler ultrasound assesses blood flow in the umbilical artery and other vessels, indicating placental function.

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### **Management of intrauterine growth restriction**

It involves close monitoring and timely interventions to optimize fetal outcomes. Regular ultrasound exams track fetal growth, amniotic fluid levels, and Doppler flow studies, while non-stress tests and biophysical profiles assess fetal well-being. Managing maternal health conditions like hypertension and diabetes is important, as is ensuring adequate nutrition and cessation of harmful behaviors such as smoking. The timing of delivery is important as early delivery may be necessary in severe intrauterine growth restriction cases to prevent stillbirth or severe complications. Corticosteroids may be administered before preterm delivery to enhance fetal lung maturity. The mode of delivery, often cesarean, depends on fetal and maternal conditions. Postnatal care in a Neonatal Intensive Care Unit (NICU) is necessary for managing complications like hypoglycemia and feeding difficulties. These combined efforts aim to improve short-and long-term health outcomes for infants affected by intrauterine growth restriction.

### **Maternal health optimization**

It is important for managing Intrauterine Growth Restriction (IUGR). It involves controlling chronic conditions like hypertension and diabetes, supplying enough nourishment, and addressing

lifestyle factors such as smoking cessation and avoiding alcohol and drugs. Regular prenatal check-ups are necessary for monitoring maternal and fetal health. Managing these health aspects helps improve placental function and nutrient delivery to the fetus, supporting better growth outcomes. Additionally, providing psychological support and education to expectant mothers can develop healthier behaviors and adherence to medical advice, further improving maternal and fetal well-being.

### **Postnatal care**

Postnatal care for infants affected by intrauterine growth restriction focuses on monitoring and managing potential complications. This includes close observation for issues such as hypoglycemia, temperature instability, and feeding difficulties, which are common in these infants. Neonatal Intensive Care Units (NICU) provide specialized care and monitoring to support their growth and development. Regular assessments of growth, neurological development, and overall health are necessary to identify and address any long-term effects of intrauterine growth restriction. Additionally, providing parental education and support helps caregivers understand and manage the unique needs of infants affected by intrauterine growth restriction, promoting their optimal health and well-being.