**ORIGINAL RESEARCH** 

# Fetal outcome of women with intrauterine growth restriction admitted in labour room of tertiary health care center

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# ABSTRACT

Background: The evaluation of fetal growth is one of the key objectives of prenatal care. Fetal growth depends on several factors, including uteroplacental function, maternal disease, maternal cardiovascular function or cardiac disease, maternal nutrition, altitude, smoking and illicit drug use, and presence of pathological conditions, such as infection, aneuploidy and some genetic conditions. However, uteroplacental insufficiency or dysfunction represents one of the most frequent causes of abnormal growth in an otherwise normal fetus. Impaired fetal growth is associated with an increased risk of perinatal mortality and morbidity, and long-term adverse infant outcome.Overall, growth-restricted fetus have a higher rate of conditions associated with prematurity, experience worse neurodevelopmental outcome and are at increased risk of noncommunicable diseases in adulthood, such as hypertension, metabolic syndrome, insulin resistance, Type-2 diabetes mellitus, coronary heart disease and stroke. Fetal size is determined through biometric evaluation of the head circumference, biparietal diameter, abdominal circumference (AC) and femur length and/or derivation of estimated fetal weight (EFW) computed by different formulae. FGR is a condition that is frequently, but unhelpfully, defined as the fetus failing to reach its genetically predetermined growth potential. The main distinction between SGA and FGR is that a SGA fetus may be small but not at increased risk of adverse perinatal outcome, while a fetus with size above the 10th percentile may be FGR and at increased risk of adverse perinatal and long-term outcome<sup>1</sup>. Methods: This prospective observational study was done at Obstetrics and Gynaecology Department in tertiary health care Centre of South Gujarat over 1 year period after obtaining approval from Ethical committee. Number of Patients All consecutive consenting women having Intrauterine growth restriction in Antenatal, Intra natal and Postnatal period admitted (Approx 200 patients) to Obstetrics Department of Tertiary care hospital will be enrolled in this study after permission from ethical committee at tertiary heath care centre of South Gujarat. All consenting women who had delivered baby with EFW <= 10 percentile with Doppler changes or EFW< 3 Percentile same gestational age in labour room of our centre. Nonconsenting patients and brought IUFD were excluded. Results: 71% of infants with IUGR had a birth weight in 1.6- <= 2.5 KG range. 18% of infants were born within 1-1.5 KG weight range. 9% of infants had a birth weight below 1 kg. 89% of cases were asymmetrical, while 11% were symmetrical in which the Biparietal Diameter is 10% for the given gestational age, indicating that asymmetrical growth patterns are more common in IUGR cases. 48% of the patients were male. 52% of the patients were female. 78 patients (39%) were discharged.15 patients (7%) ended with a negative outcome, which could imply perinatal death or severe complications leading to an unfavourable results. Among the 200 patients, 93 were admitted to the NICU. Of these:- 33% stayed for 5 to 7 days. -37% stayed for 8 days or more. -14% stayed for 1 to 4 days. Among 93 patients with perinatal morbidity, the most common issues were septicaemia (35%) and jaundice (17%). Conclusion: After doing this study and reviewing various literature about intrauterine growth restriction, it can be concluded that pregnancy with intrauterine growth restriction is associated with Increase maternal morbidity and perinatal morbidity and mortality. Pregnancy with IUGR needs early induction/CS due to fetal growth restriction which leads to Prematurity and NICU admissions in such cases. Among 93 infants who got admitted in NICU, complications seen in neonates were Septicaemia (35%), jaundice (17%) and respiratory distress syndrome (RDS) (16%). 76% of the infants had NICU stay of >=5 days. Thus, increasing the neonatal morbidity. Causes of Early neonatal death were Prematurity, RDS, Birth asphyxia, Septicaemia, Hypoglycaemia.Improving maternal nutritional status, early registration in 1st trimester, frequent antenatal visits, Quality ANC care, correction of anaemia, identifying and treating cases of Hypertensive disorders of Pregnancy, Appropriate weight gain during pregnancy, timely diagnosis and management of IUGR, providing quality NICU care may help in reduction of perinatal morbidity and mortality.

Key words: Fetal outcome, NICU admission, birth weight, perinatal morbidity and mortality

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# **INTRODUCTION**

The evaluation of fetal growth is one of the key objectives of prenatal care.Fetal growth depends on several factors, including uteroplacental function, maternal disease, maternal cardiovascular function or cardiac disease, maternal nutrition, altitude, smoking and illicit drug use, and presence of pathological conditions, such as infection, aneuploidy and some conditions.However, genetic uteroplacental insufficiency or dysfunction represents one of the most frequent causes of abnormal growth in an otherwise normal fetus.Impaired fetal growth is associated with an increased risk of perinatal mortality and morbidity, and long-term adverse infant outcome.Overall, growth-restricted fetus have a higher rate of conditions associated with prematurity, experience worse neurodevelopmental outcome and are at increased risk of non-communicable diseases in adulthood, such as hypertension, metabolic syndrome, insulin resistance, Type-2 diabetes mellitus, coronary heart disease and stroke.Prenatal recognition of fetal growth restriction (FGR) is a major factor identified in strategies aimed at preventing stillbirth, in which up to 30% of cases are associated with FGR or small-forgestational age (SGA) in the late third trimester.Fetal size is determined through biometric evaluation of the head circumference, biparietal diameter, abdominal circumference (AC) and femur length and/or derivation of estimated fetal weight (EFW) computed by different formulae.A fetus is SGA when its size (biometric evaluation) falls below a predefined threshold for its gestational age. The most common definition of SGA is EFW or AC below the 10th percentile of given reference ranges. FGR is a condition that is frequently, but unhelpfully, defined as the fetus failing to reach its genetically predetermined growth potential. The main distinction between SGA and FGR is that a SGA fetus may be small but not at increased risk of adverse perinatal outcome, while a fetus with size above the 10<sup>th</sup> percentile may be FGR and at increased risk of adverse perinatal and long-term outcome.

## AIMS AND OBJECTIVE

To study fetal outcome in pregnancy with intrauterine growth restriction.

# MATERIAL AND METHODOLOGY

**METHODOLOGY:**This prospective observational study was done at Obstetrics and Gynaecology Department in tertiary health care Centre of South

Gujarat over 1 year period after obtaining approval from Ethical committee. Number of Patients All consecutive consenting women having Intrauterine growth restriction in Antenatal, Intra natal and Postnatal period admitted (Approx 200 patients) to Obstetrics Department of Tertiary care hospital will be enrolled in this study after permission from ethical committee at tertiary heath care centre of South Gujarat. Inclusion criteria All consenting women who had delivered baby with EFW <= 10 percentile with Doppler changes or EFW <3 percentile same gestational age in labour room of our centre.

# **MEASURING TOOLS**

Neonatal parameters:

- 1. Type of IUGR.
- 2. Weight.
- 3. Maturity.
- 4. NICU admission.
- 5. Causes of NICU admission (prematurity, IUGR, meconium aspiration syndrome, Respiratory distress syndrome, Jaundice).
- 6. Causes of neonatal morbidity.
- 7. Percentage of neonatal morbidity.

The collected data was entered in MS Excel followed by its analysis. The baseline variables were represented using percentages.

This prospective observational study will be done at Obstetrics and Gynaecology department of tertiary care centre for 1-year period after official approval from Ethical Committee. All consecutive consenting women having Intra uterine growth restriction admitted to Labour room in Obstetrics department of tertiary care hospital will be enrolled in this study. We will take follow up till 5-7 days or till discharge of the mother and baby. If patient will re-admit then we will take follow up till next discharge.

**ETHICAL APPROVAL:**Ethical approval was granted by Human Resource Research Committee, confidentiality was maintained.

## **RESULTS AND OBSERVATIONS**

This Observational study was carried out in department of Obstetrics and Gynaecology, in our institute, enrolling 200 consecutive subjects fulfilling inclusion criteria with intrauterine growth restriction, patients admitted in labour room of our institute, over a period of around 1 year.

### Table 1: Weight at Birth

Weight at birth	Present study (N=200)	Percentage
1.6-<= 2.5 kg	143	71%
1-1.5 kg	39	18%

<1 kg 18 95	

71% of infants with IUGR had a birth weight in this range.18% of infants were born within this weight range. This group represents a more severe category of IUGR, where the infants are notably smaller and at higher risk of complications.9% of infants had a birth weight below 1 kg. This is the most extreme category

of IUGR, indicating severe growth restriction and likely requiring intensive medical management. In summary, most infants with IUGR in this study had birth weights between 1.6 and 2.5 kg, with a smaller proportion falling into the more severe categories of less than 1.5 kg or below 1 kg.

#### Table 2: Distribution of Symmetrical and Asymmetrical IUGR

Symmetry	No of patients(n=200)	Percentage
Asymmetrical	178	89%
symmetrical	21	11%

In relation to intrauterine growth restriction (IUGR) pregnancies, 89% of cases were asymmetrical, while 11% were symmetrical in which the Biparietal

Diameter is 10% for the given gestational age, indicating that asymmetrical growth patterns are more common in IUGR cases.

## **Table 3: Distribution According to Gender**

Gender	No of patients(n=200)	Percentage
МСН	96	48%
FCH	104	52%

48% of the patients were male. This reflects nearly equal distribution between male and female infants with IUGR in the study.52% of the patients were female. This suggests a slight predominance of female infants with IUGR in this dataset.

#### **Table 4:Perinatal Outcome**

Perinatal Outcome	No. of Patients (n=200)	Percentage
Discharge	78	39%
Early neonatal death	15	7%
Stillbirth (intra partum death)	2	1%
Not admitted in NICU	105	53%

78 patients (39%) were discharged. 15 patients (7%) ended with a negative outcome, which could imply perinatal death or severe complications leading to an unfavourable result. 2 patients (1%) experienced stillbirth, which is a critical outcome indicating that

the fetus did not survive until birth.105 patients (53%) were not admitted to the Neonatal Intensive Care Unit who did not require intensive medical intervention immediately after birth.

## **Table 5: Indication of NICU Admission**

Indication of NICU Admission	No of Patients (n=200)	Percentage
Oxygen support	10	5%
Ventilatory support	19	10%
Respiratory support	36	18%
For weight gain	20	12%
For observation	8	4%
No NICU admission needed	105	53%

The data you provided on NICU admissions in relation to intrauterine growth restriction (IUGR) highlights the reasons for NICU admission among infants with IUGR. Out of 198 patients, 53% did not require NICU admission. The primary reasons for NICU admission were respiratory distress (18%) and need for ventilatory support (10%). Oxygen support

and weight gain issues each accounted for 5% and 12% respectively, while 4% were admitted for observation. Overall, NICU admissions in IUGR infants are primarily due to respiratory complications, with significant attention also given to weight gain and oxygenation needs.

Total NICU Stay	No of Patients(n=93)	Percentage
1-4 days	12	14%
5-7 days	32	33%
>= 8days	35	37%
Early neonatal death	14	16%

# **Table 6: Total NICU Stay**

Among the 200 patients, 93 were admitted to the NICU. Of these:- 33% stayed for 5 to 7 days. -37% stayed for 8 days or more. -14% stayed for 1 to 4 days. Overall, the majority of IUGR infants have a

NICU stay of 5 days or more, highlighting the need for extended care due to complications related to growth restriction.

## **Table 7: Perinatal Morbidity**

Perinatal Morbidity	No of Patients (n=93)	Percentage
Respiratory distress syndrome	15	16%
Birth asphyxia	4	4%
Septicaemia	33	35%
Seizures	9	9%
Jaundice	16	17%
Transient tachypnoea of Newborn	7	7%
Congenital anomaly	4	4%
hypoglycaemia	5	5%

Intrauterine Growth Restriction (IUGR) can lead to various perinatal morbidities. Among 93 patients with perinatal morbidity, the most common issues were septicaemia (35%) and jaundice (17%).Respiratory Distress Syndrome (RDS) affected 16% of patients, while seizures and transient tachypnoea of the newborn were less common, affecting 9% and 7%, respectively. Birth asphyxia and congenital anomalies each occurred in 4% of cases, and hypoglycaemia affected 5%. This distribution highlights that septicaemia and jaundice were the most prevalent complications in the context of perinatal morbidity.Overall, IUGR increases the risk of several perinatal complications due to underlying issues with growth and development in utero.

# DISCUSSION

Perinatal implications of intrauterine growth restriction <sup>2</sup>Perinatal implications of intrauterine growth restriction (IUGR) are significant, affecting both morbidity and mortality outcomes for the fetus and new born. Here's a breakdown of these implications:

# MORBIDITY

- 1. NEONATAL RESPIRATORY DISTRESS SYNDROME (RDS): IUGR infants are at increased risk of RDS due to immaturity of the lungs, resulting in breathing difficulties shortly after birth.
- 2. HYPOGLYCAEMIA:Reduced glycogen stores and altered glucose metabolism in IUGR infants can lead to hypoglycaemia, which may require intervention to maintain adequate blood sugar levels.

- **3. HYPOTHERMIA:**IUGR infants have less subcutaneous fat and reduced thermoregulatory capacity, predisposing them to hypothermia after birth.
- 4. INTRAVENTRICULAR HAEMORRHAGE (IVH): Prematurity and fetal compromise in IUGR pregnancies increase the risk of IVH, a serious complication associated with long-term neurodevelopmental impairment.
- **5. NECROTIZING ENTEROCOLITIS (NEC):** IUGR infants, especially those born prematurely, are at higher risk of NEC, an inflammatory bowel disease that can lead to bowel perforation and sepsis.
- 6. SEPSIS:Immaturity of the immune system and susceptibility to infections contribute to an increased risk of sepsis in IUGR infants, necessitating prompt diagnosis and treatment.
- 7. LONG-TERM NEURODEVELOPMENTAL IMPAIRMENT:IUGR infants may experience cognitive deficits, learning disabilities, and behavioural problems later in life, affecting their overall neurodevelopmental outcome.

# MORTALITY

- 1. **STILLBIRTH:**Severe IUGR is associated with an increased risk of stillbirth due to placental insufficiency, fetal hypoxia, and intrauterine demise, particularly when fetal compromise is detected late, or management is delayed.
- 2. **PERINATAL MORTALITY:**IUGR infants have a higher risk of perinatal mortality, encompassing stillbirths and neonatal deaths within the first week of life, often related to complications of prematurity, fetal distress, or underlying medical conditions.

**3. INCREASED RISK OF NEONATAL DEATH:**The combination of prematurity, low birth weight, and fetal compromise increases the vulnerability of IUGR infants to neonatal mortality, necessitating close monitoring and specialized care in the neonatal period.

## TO IMPROVE NEONATAL OUTCOME

- 1. NEONATAL INTENSIVE CARE: Infants born with IUGR require close monitoring and supportive care in the neonatal intensive care unit (NICU) to manage complications such as respiratory distress, hypoglycaemia, and hypothermia.
- 2. NUTRITIONAL SUPPORT: Nutritional support, including early initiation of breastfeeding or formula feeding and monitoring of caloric intake, is essential to support growth and development in IUGR infants.
- **3. DEVELOPMENTAL FOLLOW-UP:**Longterm developmental follow-up is recommended to monitor growth, neurodevelopmental outcomes, and potential complications associated with IUGR.

The management of IUGR involves comprehensive antenatal care, fetal surveillance, intervention as needed, and careful planning for delivery to optimize outcomes for both the mother and the fetus. Close collaboration between obstetricians, maternal-fetal medicine specialists, neonatologists and other healthcare providers is essential to provide individualized care and support throughout the pregnancy and postnatal period.

In the present study, 71% of the 200 patients had a birth weight between 1.6-2.5 kg, 18% had a weight between 1-1.5 kg, and 9% had a weight less than 1 kg,In comparison with Hugh O "Conor AJOG 2015 study<sup>3</sup> 71% cases had asymmetrical IUGR And 29% had symmetrical IUGR. Among the 200 patients, 52% were female children (FCH) and 48% were male children (MCH).

Among the 200 patients, 46 % were admitted in NICU of which 39% were discharged,7% had an Early Neonatal Death.

Among the 200 patients admitted to the NICU, 37% required admission due to respiratory distress, 22% for weight gain, 20% needed ventilatory support, 11% required oxygen support, and 8% were admitted for observation, Among the 93 patients in the NICU, 33% stayed for 5 to 7 days, 37% stayed for 8 days or more, 12% stayed for 1 to 4 days, and 16% had an Early Neonatal Death.

In comparing perinatal morbidity between the present study (n=93) and Sinha S *et al.* (n=50), the following key differences are noted:- Respiratory Distress Syndrome (RDS): 16% in the present study versus 8% in Sinha S *et al.* Birth Asphyxia: 4% in the present study versus 2% in Sinha S *et al.* -Septicaemia: 35% in the present study versus 26% in Sinha S *et al.*-

Seizures: 9% in the present study versus 4% in Sinha S *et al.* -Jaundice: 17% in the present study versus 10% in Sinha S *et al.* -Transient Tachypnoea of New born: 7% in the present study versus 0% in Sinha S *et al.* -Congenital Anomaly: 4% in both studies. -Hypoglycaemia: 5% in the present study versus 6% in Sinha S *et al.*<sup>4</sup>.

# CONCLUSION

After doing this study and reviewing various literature about intrauterine growth restriction, it can be concluded that pregnancy with intrauterine growth restriction is associated with Increase maternal morbidity and perinatal morbidity and mortalityPregnancy with IUGR needs early induction/CS due to fetal growth restriction which leads to Prematurity and NICU admissions in such cases. Among 93 infants who got admitted in NICU, complications seen in neonates were Septicaemia (35%), jaundice (17%) and respiratory distress syndrome (RDS) (16%). 76% of the infants had NICU stay of >=5 days. Thus, increasing the neonatal morbidity.In present study, NICU Admission rate is higher in patients with IUGR (48%) as compared to overall Deliveries at our centre (19%), suggestive of increased neonatal morbidity in pregnancies with IUGR.Neonatal mortality was 7%, as compared to the early neonatal deaths of the total deliveries at our centre (1.6%) which is suggestive of increased neonatal mortality. Causes of Early neonatal death were Prematurity, RDS, Birth asphyxia, Septicaemia, Hypoglycaemia. Improving maternal nutritional status, early registration in 1st trimester, frequent antenatal visits, Quality ANC care, correction of anaemia, identifying and treating cases of Hypertensive disorders of Pregnancy, Appropriate weight gain during pregnancy, timely diagnosis and management of IUGR, providing quality NICU care may help in reduction of perinatal morbidity and mortality.

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