



## **STUDY OF PERINATAL OUTCOME IN CASES WITH INTRAUTERINE GROWTH RESTRICTION**

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### **Abstract:**

*Intrauterine Growth Restriction (IUGR) is a common complication of pregnancy and carries an increased risk of Perinatal Mortality and Morbidity, the latter possibly extending also in adult life. Fetal Growth Restriction is the second leading cause of Perinatal Morbidity and Mortality, followed only by Prematurity. This study has been done to investigate the contribution of socio-demographic and reproductive-obstetric risk factors of IUGR and to evaluate the perinatal outcome in these cases.*

**Key Words:** Intrauterine Growth Restriction (IUGR), Perinatal Outcome & Risk Factors

### **Introduction:**

Intrauterine Growth Restriction (IUGR) is a common diagnosis in obstetrics and carries an increased risk of Perinatal Mortality and Morbidity, the latter possibly extending also in adult life.

The growth of the fetus in pregnancy is indicated by its anthropometric measurements at birth, particularly weight. In fact, the Birth Weight of an infant is the most important determinant of its Morbidity and Mortality (Patrica and Andrew, 1996)<sup>1</sup>. Neonatal Death is 40 times more likely among LBW infants as compared to infants of normal birth weight. Timely diagnosis and management of IUGR is one of the major achievements in contemporary obstetric practice. If the growth-restricted fetus is identified and appropriate management instituted, Perinatal Morbidity/Mortality can be reduced, underscoring the need for assessment of Fetal Growth at each prenatal visit. This study has been done to investigate the contribution of socio-demographic and reproductive-obstetric risk factors of IUGR and to evaluate the perinatal outcome in these cases.

### **Aims and Objective:**

- To study
- ✓ The incidence of IUGR over a period of 3 years
- ✓ Risk Factors Predisposing to IUGR.
- ✓ The Neonatal Outcome in IUGR

Total 210 cases of Intrauterine Growth Restriction in a tertiary care centre over a period of 3 years were studied.

### **Material and Methods:**

**Study Area:** A multidisciplinary Tertiary care hospital in A Metropolitan city.

**Study Period:** Three years duration

**Study Population:** All the cases of Intrauterine Growth Restriction (Total 210 cases) in a tertiary care centre in Mumbai over a period of 3 years i.e. June 2008 to May 2011 were studied.

**Type of Study:** Retrospective & Observational Prospective.

### **Inclusion Criteria:**

- ✓ Patients with >28 weeks gestation,
- ✓ Who were sure of their last menstrual period, or atleast had one first trimester ultrasound.
- ✓ Patients with singleton pregnancies with Fetal Growth Restriction.

**Exclusion Criteria:**

- ✓ Patients with unsure dates, irregular menstrual cycles.
- ✓ Multifetal pregnancy

**Results:**

The incidence of IUGR was 4.89% (305 out of 6229 total deliveries). 210 cases were included after applying exclusion criteria. 116 patients (55%) were in the age group of 21 to 25 years. Birth Weight decreased at extremes of age group (<20yrs &>35 yrs) (Table1). 114(52%) patients came from Lower Socio economic group with a Mean Birth Weight of 1812 gms, 73 (36%) from middle class with a Mean Birth Weight of 1871 gms and 23 (12%) from higher class with MBW of 1923 gms (Table2). 115 (55%) cases were Primigravida, 60 (29%) were Gravida2, and 35 (16%) were Gravida3 and above. MBW was least (1801 gms) in Primigravida (Graph 1). 150 (71%) were unregistered and only 60 (29%) were registered (Graph 2). 150 cases had either no visit or less than 3 visits, 46 (22%) had 3-4 visits and 14 (7%) had more than 4 visits (Table 3).

Anemia was found to be the most common high risk factor in 131 (62%) cases, out of which 103 had mild, 23 moderate and 5 had severe anemia. However no significant association was found between anemia and IUGR (p value =0.29). Least MBW (1660 gms) was seen in cases with severe anaemia. PIH was seen in 89 cases, out of which 56 had mild PIH and 33 had severe PIH. Cases with severe PIH had least MBW of 1387 gms. Association between PIH & IUGR was found to be significant. (p value =0.0018). 34 cases had febrile illness during pregnancy out of which Malaria was the most common (19 cases). Other maternal high risk factors associated with IUGR were history of previous IUGR (10 cases), heart disease (9 cases), undernourishment (9 cases), history of bleeding in First Trimester (8 cases), uterine anomalies (4 cases), placenta previa (3 cases) and 1 case each of hypothyroidism and gestational diabetes (Table 4).

103 cases delivered between 33 to 36 weeks gestation. Average gestational age at the time of delivery was 36 weeks 3 days. There were total 111 (53%) preterm deliveries(<37 weeks) (Table 5). 183 cases had HC/AC ratio more than 1 suggestive of higher number of asymmetrical cases and 27 cases had ratio less than 1 suggestive of symmetrical cases (Graph 3).

On placental histopathology, calcification was seen in 65 cases, Subfibrin Plaque in 43 cases, infarction in 41 cases and retro placental clot in 4 cases (Graph 4). 50% cases had Oligohydramnios. Oligohydramnios in IUGR was found to be associated with poorer neonatal outcome compared to those without Oligohydramnios (Table 6). 118 cases had vaginal delivery and 92 cases had to undergo LSCS (Graph 5). The most common indication for LSCS was fetal distress (Graph 6). 17 babies had APGAR score less than 3 at 1 & 5 minutes, out of which 9 succumbed to death (Table 7). 156 cases(75%) required neo natal intensive care out of which 29 required NICU care for more than 20 days maximum being 62 days (Graph 7). 113 babies developed neo natal complications out of which RDS ( Respiratory distress syndrome ) was the most common (45 cases)(Table 8). Incidence of perinatal mortality in this study was 9.04% (17 NNDs and 2 FSB) (Table 9). 52% neo natal deaths were due to Respiratory Distress Syndrome (Graph 8).

**Table No 1: Maternal Age in Relation with IUGR**

AGE in yrs	No. of Cases (%)	MBW*
20 or less	024 (11)	1801
21-25	116 (55)	1842
26-30	051 (24)	1944

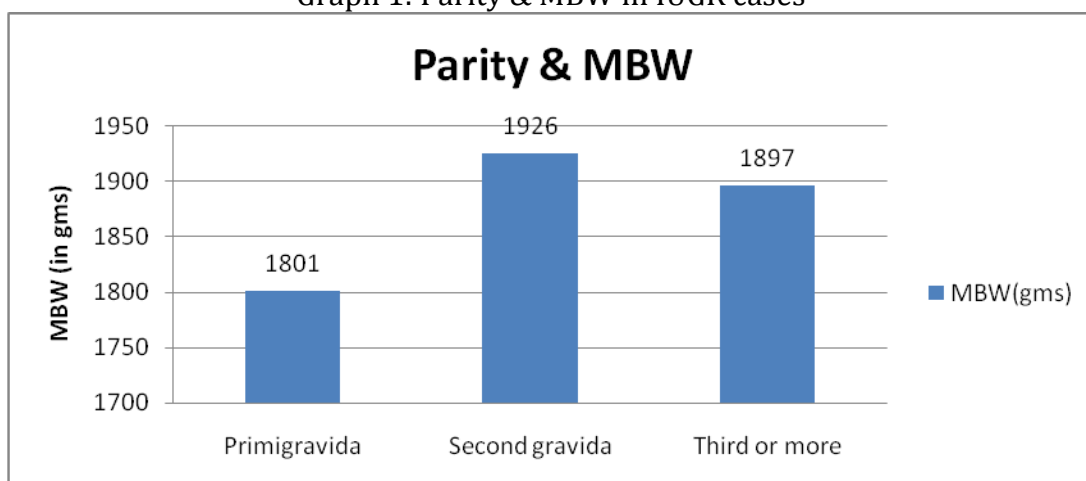
31-35	016	(08)	1800
>36	003	(02)	1783
TOTAL	210	(100)	<b>1853</b>

(\*MBW- mean birth weight in gms)

Table 2: Socio – Economic Status in Relation with IUGR

Class	No. of Cases (%)	MBW
Lower Class	114 (52)	1827
Middle Class	073 (36)	1871
Higher Class	023 (12)	1923
TOTAL	210 (100)	1853*

Graph 1: Parity & MBW in IUGR cases



Graph .2: Correlation of Antenatal Registration with MBW in IUGR cases

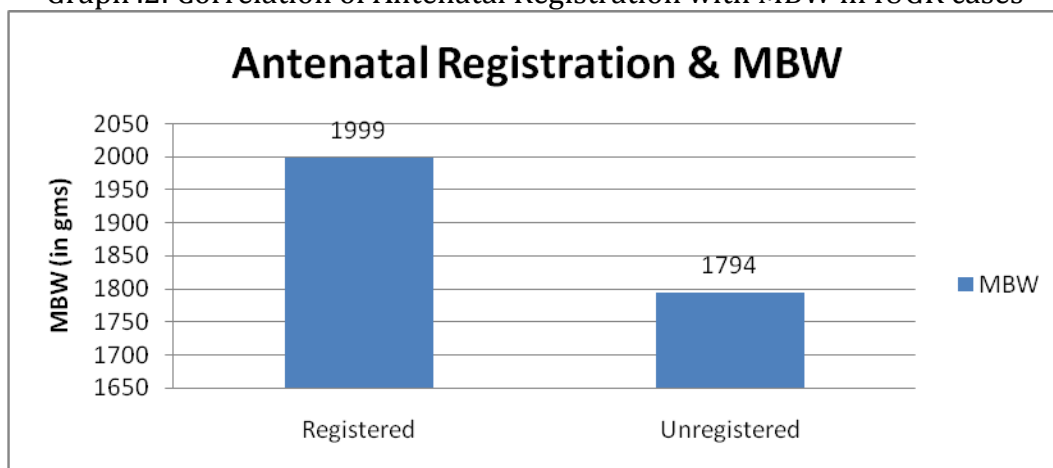


Table 3: Number of Antenatal Visits

No. of Visits	No. of Cases (%)	MBW
<3	150 (71)	1794
3-4	046 (22)	1948
>4	014 (07)	2168
TOTAL	210	1853*

Table 4: Maternal High Risk Factors Associated With IUGR

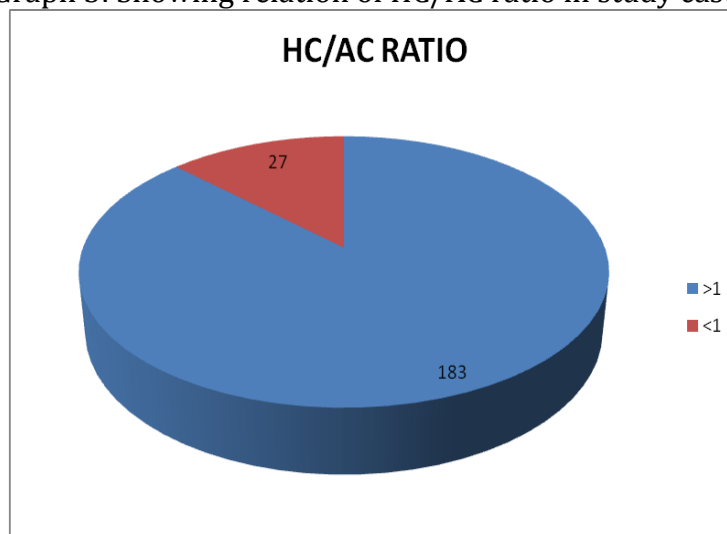
High Risk Factor	No. of Cases	%
Anemia	131	62.00
Pregnancy Induced Hypertension	089	42.00
Febrile Illnesses	034	16.00
H/O Prev IUGR	010	04.70
Heart Disease	009	04.00

Undernourished	009	04.00
H/O Bleeding In 1 <sup>st</sup> Trimester	008	03.80
Uterine Anomaly	004	01.90
Placenta Previa	003	01.40
Hypothyroidism	001	00.40
Gestational DM	001	00.40
Idiopathic	012	05.71

Table 5: Gestational Age at the Time of Delivery

Gestational age	No. of Cases	%	MBW
28 - 32 weeks	008	0.4	1184
33 - 36 weeks	103	49	1755
37 - 40 weeks	090	43	2009
More than 40 weeks	009	0.4	2001
TOTAL	210	100	1853*

Graph 3: Showing relation of HC/AC ratio in study cases



Graph 4: Showing Placental Histopathology in study cases

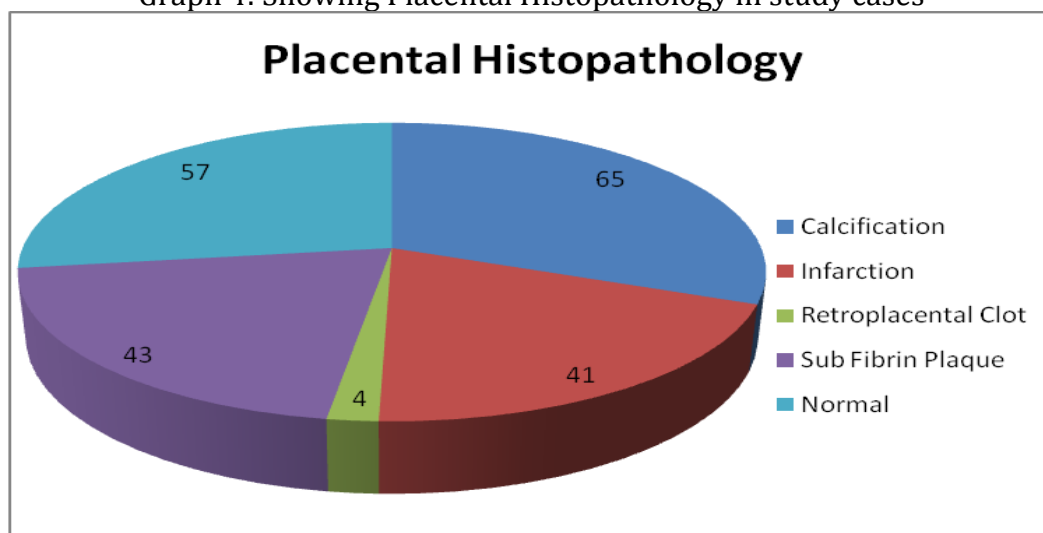
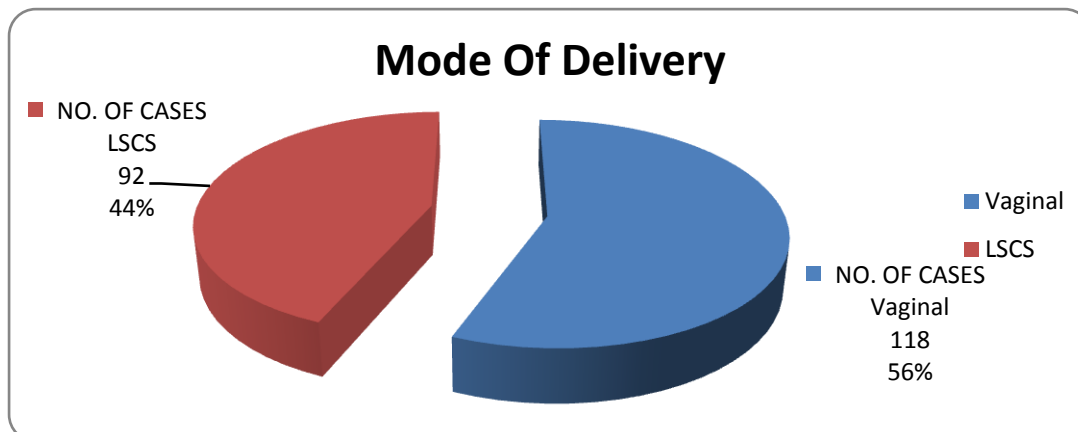


Table 6: Correlation of Oligohydramnios with Perinatal Outcome

	Cases with Oligohydramnios (105 cases)	(%)	Cases without Oligohydramnios (105 cases)	(%)
MBW (in gms)	1746 gm		1960 gm	
Need for LSCS	58	(55)	34	(32)
NICU Admission	89	(85)	69	(66)

Neonatal Complication	62	(59)	51	(49)
Perinatal Mortality	15	(14)	4	(03)

Graph 5: Showing mode of delivery in IUGR cases



Graph 6: Showing indication of LSCS in IUGR cases

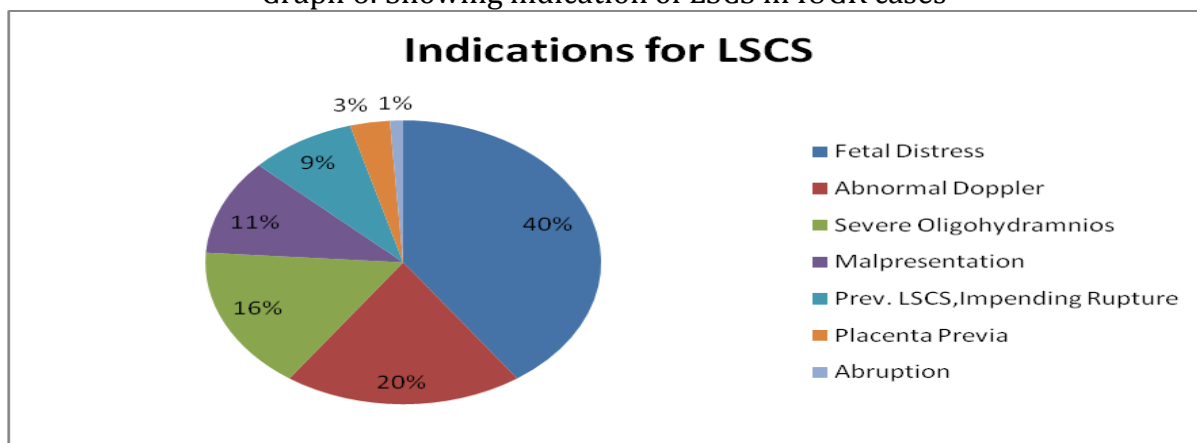


Table 7: Apgar score in IUGR

APGAR score (at 1 & 5 min)	No. of Cases	MBW in gms	NICU admission	Neonatal Complication	Mortality
7 - 10	144 (69%)	1956	092 (63%)	58 (40%)	01 (0.6%)
4 - 6	047 (23%)	1678	047 (100%)	37 (79%)	07 (15%)
3 or less	017 (08%)	1573	017 (100%)	17 (100%)	09 (53%)
TOTAL	208 (excluding 2 FSB)		156	02	17 Neonatal Deaths

Graph 7: Showing NICU admission in IUGR case

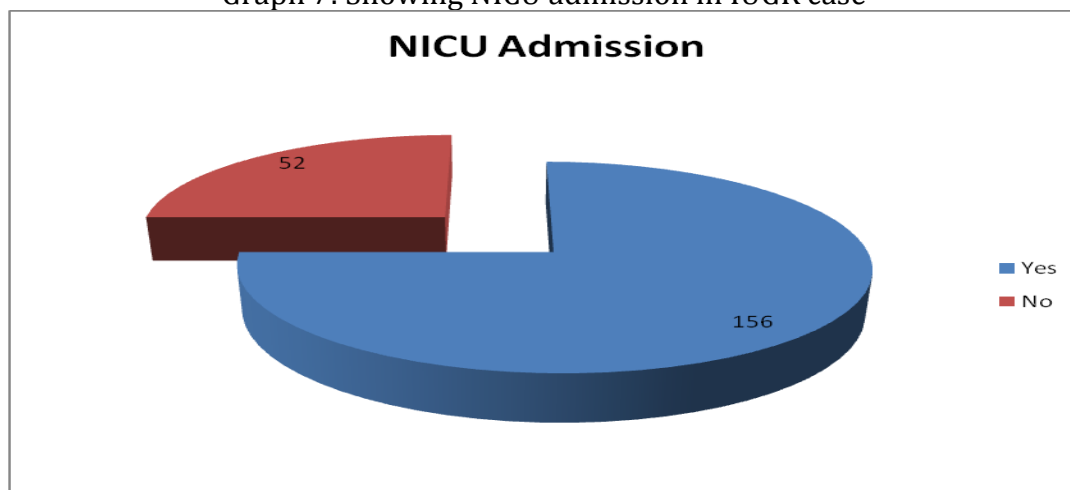


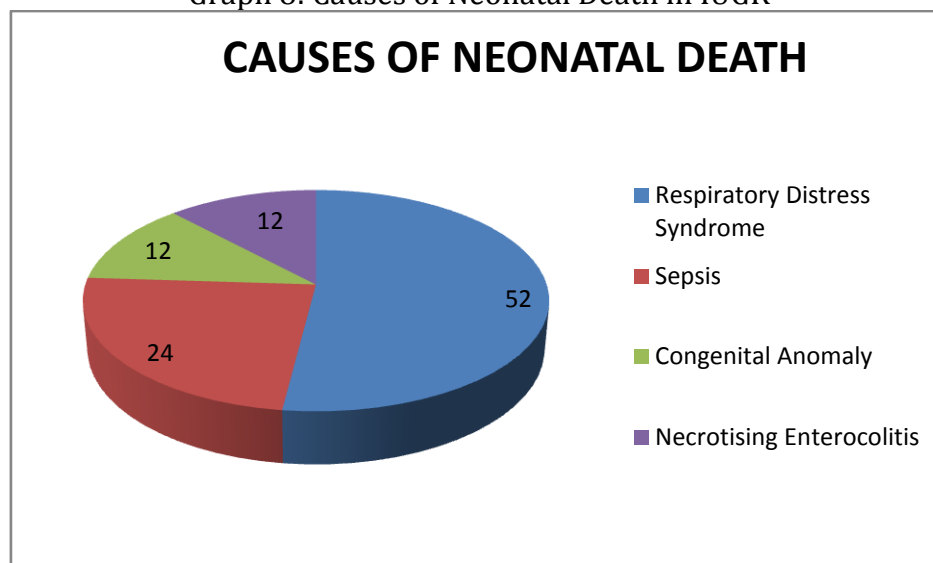
Table 8: Neonatal Complications in IUGR

Complication	No. of Cases	%
Respiratory Distress Syndrome	045	39
Sepsis	026	23
Asphyxia	019	17
Hyperbilirubinemia	017	15
Hypoglycaemia	003	03
Necrotising Enterocolitis	003	03
TOTAL	113	100

Table 9: Perinatal Mortality in IUGR

	No. of Cases	%
Neonatal death	17	08.14
Fresh still birth	02	00.90
TOTAL	19	09.04

Graph 8: Causes of Neonatal Death in IUGR



**Discussion:**

Sharon and Gilberto (2003)<sup>2</sup> analyzed data of 5961 mothers aged  $\geq 15$  years. 676 mothers were in the age group of less than 20 yrs, out of which 27 delivered IUGR infants (OR-2.1). It was concluded that mothers with infants who had IUGR were more likely to be younger than 20 years. In the present study, maximum number of cases 116 (55%) were seen in the age group of 21 – 25 years. K. S. Negi et al (2006)<sup>3</sup> concluded that Primigravidae have 3 times the risk of delivering babies with low birth weight compared to Gravida2 and more. H. S. Joshi *et al* (2005)<sup>4</sup> in their study on 256 mothers found that Primiparous women had more number (29.11%) of LBW babies. In the present study out of 210 cases, 115 (55%) cases were Primigravida. Also the Mean Birth Weight was least (1801gm) in Primigravida thus showing preponderance of IUGR more in PRIMIGRAVIDA.

H. S. Joshi *et al* (2005)<sup>4</sup> in their study on 256 mothers and their newborn, found that 75% of newborns delivered by mothers suffering from pre-eclampsia and eclampsia during present pregnancy were LBW. Visseret *al*<sup>5</sup> found Hypertensive Disorder to be the most common causative factor for IUGR accounting for 59% of the cases.

H.S Joshi *et al* (2005)<sup>4</sup> in his study found that out of 76 newborns (30%) delivered by anaemic mothers, 61.84% were LBW. Strength of association was maximum with severe anaemia ( $p < 0.001$ ). On the contrary, Lt. Col. G. Singh (2009)<sup>6</sup> in his study,

concluded that anemia was not a significant factor (  $p>0.05$ ) for low birth weight. In study by Sharon & Gilberto (2003)<sup>2</sup>, 253 mothers had history of previous infant with LBW and 28 (11.1%) of them had IUGR (OR-6.1). In the present study , Anemia was the most common risk factor found in 62% (131) cases, out of which 103 had mild(Hb 9-12 gm%), 23 had moderate (Hb 6-9 gm%) and 5 had severe anaemia (Hb less than 6 gm%). However no significant association was found between Anemia & IUGR ( $p=0.29$ )

In a case control trial of IUGR cases by Gardosi G and Francis A (1999)<sup>7</sup>, 52 cases (7.8%) were Pre term births (less than 37 weeks) and 278 (92.2%) cases were delivered at more than 37 weeks of gestation. In study by Lt. Col. G. Singh (2009)<sup>6</sup>, higher incidence of preterm delivery was seen in LBW babies (15% vs 6.33%,  $p>0.05$ ), which was not statistically significant. In the present study, 103(49%) delivered between 33-36 weeks gestation. There were total 111 cases (53%) with preterm delivery (less than 37 weeks). Hypertensive disorders were responsible for 50 % of preterm deliveries.

#### **Amniotic Fluid Index:**

S.No	Author	Incidence of Oligohydramnios in IUGR
1	Queenan JT (1994) <sup>8</sup>	85%
2	Chamberlain et al(1984) <sup>9</sup>	Increased perinatal mortality rate of 10.9% in oligohydramnios
3	Present Study	50%

Sood *et al* (1987)<sup>10</sup> in their study found the percentage of LSCS to be 35% in symmetrical and 29% in asymmetrical IUGR. In the present study,118 (56%) cases had vaginal delivery out of which 82 (69.5%) were spontaneous and 36 (30.5%) were induced with prostaglandins. 92 (44%) cases had to undergo LSCS . The most common indication for LSCS was fetal distress seen in 40 % cases.

#### **APGAR Score in IUGR:**

In a case study of immediate outcome of babies with low APGAR score in MULAGO hospital, UGANDA by C. ONDOA. ONAMA *et al* (2003)<sup>11</sup> showed that the prevalence of low APGAR scores at 1&5 minutes was 8.4 & 2.4. Prevalence of a 5 min APGAR score <7 was significantly higher in IUGR babies. In the present study, poor neonatal outcome was seen in cases with APGAR score less than 3. (Perinatal mortality in poor APGAR score babies – 53%).

Nelson KB *et al* (1997)<sup>12</sup> in their study found neonatal complications like Asphyxia, hypoglycemia, hypocalcemia, pulmonary complications, hypothermia, congenital malformations and infections to be more common in IUGR infants as compared to normal. In the present study, the most common complication was respiratory distress syndrome seen in 45 cases (39%).

#### **Perinatal Outcome:**

S.No	Authors	
1	Patrica& Andrew(1991) <sup>1</sup>	Neonatal deaths 40 times among LBW infants
2	Cunningham FG,et al (1997 ) <sup>13</sup>	5 to 30 times greater perinatal mortality if babyweight<2500gm
3	Present study	9.04% perinatal mortality

In the present study, out of 210 babies, 156 required NICU admission, 113 developed neo natal complications and 21 required ventilatory supports. There were 2 fresh stillbirths and 17 neonatal deaths. Of the 2 stillbirths, 1 case had abruption and 1 had eclampsia.

#### **Conclusion:**

To conclude:

- ✓ Regular antenatal checkup is key to diagnosis of IUGR.



- ✓ Consider ultrasound evaluation for fetal growth in patients who have risk factors for IUGR.
- ✓ Close Antepartum Surveillance once IUGR has been identified.
- ✓ Deliver the IUGR fetuses when the risk of death in utero outweighs the risk of Prematurity.

Reduction in Incidence of Growth Retardation in India can be achieved by:

- ✓ Promotion of prepregnancy adolescent health and nutrition.
- ✓ Promotion of Female Literacy.
- ✓ Increasing the age at child bearing.
- ✓ Promotion of proper birth spacing, increasing the birth interval.
- ✓ Provision of good Antenatal care and Neonatal care.

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