

ORIGINAL RESEARCH

Cross Sectional Study To Determine Prevalence Of Intrauterine Growth Restriction In Jehangir Hospital, Pune

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ABSTRACT

Background: Intrauterine growth restriction (IUGR) is a frequent complication of pregnancy with a complex etiology and limited management options. Many maternal and fetal risk factors are responsible for IUGR. **Aim:** This study was conducted to determine the prevalence of IUGR and to understand the maternal characteristics and risk factors of IUGR fetuses in our hospital. **Methods:** A cross-sectional study was carried out in the department of Obstetrics and gynecology, at Jehangir Hospital, Pune, Maharashtra, for a study period of one year. Women who presented with confirmed IUGR were enrolled in our study. A detailed history especially regarding nutrition, habits (alcohol intake, smoking and tobacco chewing), socioeconomic status and adequate weight gain were elicited carefully. On clinical examination Discrepancy of more than or equal to three weeks between the symphysiofundal height and gestational age was considered to suspect IUGR. **Results:** A total of 1462 maternity women were participating in this study out of which total no of diagnosed IUGR cases was 53. Prevalence of IUGR in our hospital was 3.6. Almost half of the cases were seen in the age group of 25-29 years (54.71%), slightly higher percentage of Multigravidae (50.9%), seventy percentage belonged to the upper middle and upper class. Majority of IUGR cases in this study were due to poor maternal weight gain (43%), and pregnancy induced hypertension cases (19%), Majority of the cases have an AFI between 5.1 to 10 (56%) and 60.37% showed deranged Doppler studies 58.49% of the cases with IUGR were induced and 58.49% of IUGR babies underwent Caesarean Section. **Conclusions:** IUGR is a common health issue in Obstetrics; several social, educational and nutritional factors play a role in causation of a IUGR. Nutritional deficiencies and insufficient growth environment which results in anemia and hypertensive disorders of pregnancy which are potent risk factors for IUGR

Keywords: Intrauterine growth restriction (IUGR), Risk factors, PIH, low birth weight

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INTRODUCTION

Intrauterine growth restriction (IUGR) is defined as the velocity of fetal growth less than the normal fetus growth potential for a specific neonate or it is the failure of the fetus to achieve its growth potential [1]. IUGR is not synonymous with small- for- gestational-age (SGA), or fetal malnutrition (FM), because the situation may exist with or without these conditions in any newborn [2]. IUGR or fetal growth restriction (FGR) is a common complication of pregnancy leading to multiple adverse perinatal outcomes. The prevalence of FGR is variable but grossly affects 5–10 % of uncomplicated gestations and up to 25% in high risk gestation. Also it is the second most common cause of perinatal mortality [3-4]. FGR babies have an increased risk for perinatal mortality, complications of prematurity and birth adaptation. On a long-term

basis, they have an increased risk for developing short stature, cognitive delay with decreased academic achievement and increased risk of neurologic disorders, including cerebral palsy [5-6]. The greatest incidence of intrauterine growth restriction in developing countries is multi-factorial and involves a complex collaboration between fetal, placental, and maternal factors even though the maternal factors are the most predominant causes [7]. Maternal, fetal and placental risk factors lead to a 'stressed' fetus with high levels of inflammatory markers. Several markers like interleukin-6, tumour necrosis factor α , C reactive protein, myeloperoxidase and adiponectin levels have been demonstrated to be significantly high in cord blood samples [8-9]. IUGR is now proven to be associated with increased rates of coronary heart disease, stroke, hypertension, PCOS in women and

type 2 diabetes. Hence, it is important to diagnose and mitigate this condition, as it would lead to substantial burden to the society on long-term basis [10].

AIMS & OBJECTIVES

This study was conducted to determine the prevalence of IUGR in women who deliver at our hospital during the study period.

MATERIAL AND METHODS

This cross-sectional study was conducted in the department of obstetrics and gynecology, at Jehangir Hospital, Pune, Maharashtra, for a study period of one year from 1st September 2006 to 31st August 2007. Women who presented with confirmed IUGR were enrolled in our study. Intrauterine growth restriction (IUGR) was assessed using various standard parameters

INCLUSION CRITERIA

- Pregnant women age range 15-35 years.
- All singleton pregnancies with vertex presentation (28 to 40 wks) who have been diagnosed as IUGR
- Women who provide written consent for the study

EXCLUSION CRITERIA

- Women <15 or > 35 years of age
- Major congenital anomalies
- Multiple pregnancies
- Malpresentations
- Small for Gestational age babies
- Who not willing for the study

A detailed history especially regarding nutrition, habits (alcohol intake, smoking and tobacco chewing), socioeconomic status and adequate weight gain were

elicited carefully. On clinical examination Discrepancy of more than or equal to three weeks between the symphysiofundal height and gestational age was considered to suspect IUGR. All antenatal mothers enrolled in the study were screened by ultrasonography as per protocol.

Intrauterine growth restriction (IUGR) was assessed using various parameters including: Abdominal circumference (AC), Biparietal Diameter (BPD), Head Circumference (HC), Femoral Length (FL), FL/AC ratio, HC/AC ratio, Expected birth weight (EBW) according to Hadlocks formula, Amniotic Fluid Index (AFI) using the four quadrant technique and Serial Growth Charts & Doppler studies.

STATISTICAL ANALYSIS

Data were analyzed using statistical package for social science (SPSS) software version 20. Frequency, percentage, Mean and standard deviation were calculated. P value <0.05 considered statistically significant

RESULTS

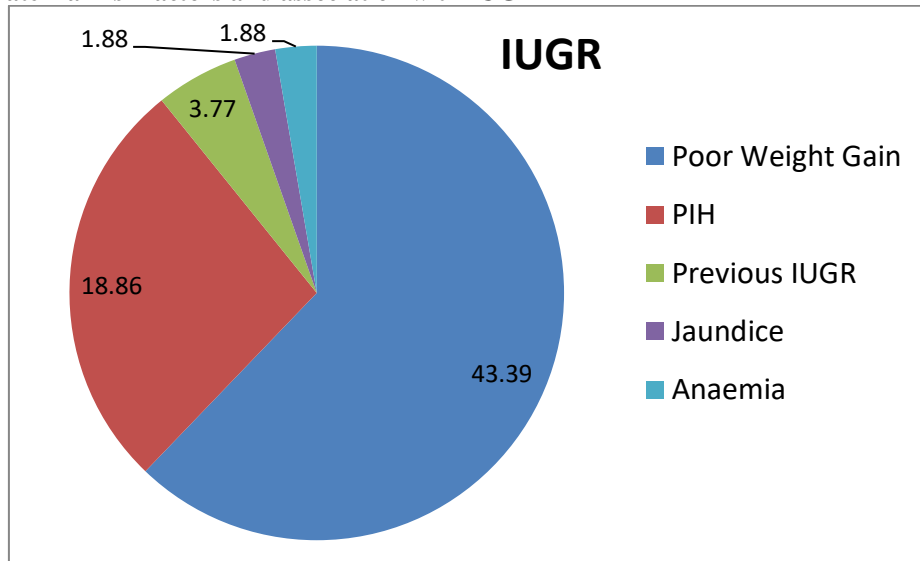
A total of 1462 deliveries occurred during study period in our hospital, out of which total no of diagnosed IUGR cases was 53. Prevalence of IUGR in our hospital was 3.6%.

Almost half of the cases were seen in the age group of 25-29 years (54.71%), slightly higher percentage of Multigravidae (50.9%) as compared to primigravida, more than half the cases (70%) belonged to the upper middle and upper class, contrary to higher incidence of IUGR in lower class, More than half of the women (58%) in this study had a weight gain in pregnancy of less than 8 kgs. This indicates the higher incidence of IUGR being in those with poor maternal weight gain in pregnancy [table:1].

Table 1: Maternal characteristics and its association with IUGR

Maternal characteristics	No. of Cases (n=53)	Percentage (%)	
Maternal age (in yrs)	15-19	2	3.77
	20-24	18	33.96
	25-29	29	54.71
	30-35	4	7.54
Socioeconomic status	Lower	2	3.77
	Lower Middle	13	24.52
	Upper Middle	20	37.73
	Upper	18	33.96
Parity	Primigravida	26	49.01
	Multigravidae	27	50.9
Weight Gain in Pregnancy	< 5	16	30.18
	5.1-8	15	28.30
	8.1-15	17	32.06
	>15	5	9.43

Majority of IUGR cases in this study were due to poor maternal weight gain (43%), the rest being due to pregnancy induced hypertension in 10 cases (19%), Prev IUGR in 2 cases (3.77%), Jaundice in 1 case (1.88%) and 1 (1.88%) was due to Anemia [figure:1].

Figure 1: Maternal risk factors and association with IUGR

Majority of the cases have an AFI between 5.1 to 10 (56%) and 60.37% showed deranged Doppler studies with increased fetoplacental resistance [Table: 2].

Table 2: Amniotic Fluid Index and Doppler study association with IUGR

Variable	No. of Cases (n=53)	Percentage (%)
Amniotic Fluid Index	< 5	8
	5.1-10	30
	10.1-15	12
	> 15	3
Doppler study	Normal	21
	Deranged	32

More than half of the cases with IUGR (58.49%) were induced due to various obstetric reasons, 58.49% of IUGR babies underwent Caesarean Section (24 emergency and 7 elective Caesarean Section) [table:3].

Table 3: Labour characteristics and IUGR infants

Variable	No. of Cases (n=53)	Percentage (%)
Onset of Labour	Spontaneous	22
	Induced	31
Mode of Delivery	Normal Vaginal	21
	Forceps	1
	Emergency LSCS	24
	Elective LSCS	7

DISCUSSION

Intrauterine growth restriction is a commonly faced circumstance in obstetrics, and not only, but it is also associated with perinatal morbidity and mortality. Consequently, it is indispensable to differentiate and diagnose it and take an instantaneous action [11].

The prevalence of IUGR fetuses in the current study was 3.6%, this figure closely resembled that study by Lin et al [12] who observed a prevalence rate of 3.2%, in contrast to our study many other studies reported higher prevalence of IUGR, Verhoeff F et al [13] and Berendes HW et al [14] reported IUGR 24.4% and 20.3% respectively. The prevalence variation may be due to change in altitude, different socioeconomic factors, ethnicity, and various maternal factors.

The present study showed that majority of the women were in the age group of 20-29 yrs, our results was

concordance with the Tesfa et al [15]. Hence, young maternal age was identified as an independent risk factor for fetal growth restriction compared to older mothers

Parity does not affect the prevalence of IUGR in our study, even distribution in primi and Multiparous women; similar finding reported by Dapkekar P et al [16], whereas according to Motghare et al [17], primiparity had more chance of IUGR and Ashwani et al [18]. has shown multiparity as a significant factor in developing IUGR.

Present study found that most of the women belonged to the upper middle and upper socioeconomic status, however: Sinha k et al [19] and Singh and Ambujam et al [20], a higher prevalence of IUGR has been associated with low socioeconomic status. Maternal health and nutrition are impacted by socioeconomic

factors such as housing quality, employment, education level, and water supply source.

Maternal body mass index is a substantial modifiable risk predictor for intrauterine growth restriction including low birth weight, preterm labor, and small for its gestational age. In this study, poor maternal weight gain was a variable associated with majority of IUGR cases, accordance to the Thiruvalla et al [21].

The majority of studies conducted on maternal risk factors of IUGR showed that poor maternal weight gain and hypertensive disorders of pregnancy were significant causes of fetal growth restriction supporting the findings of the current study [22]. However, Ashwani et al. found that antepartum hemorrhage was one of the important risk factors of IUGR which was not significant in the current study.

In our study majority of the cases have an AFI 5.1-10 and showed deranged Doppler studies with increased fetoplacental resistance in USG, comparable with the other studies like: Kamphof HD et al [23], and Gidi NW et al [24].

Present study found most of the labours were induced for various obstetric indications like IUGR and PIH. Mode of delivery of these IUGR babies underwent Caesarean Section (emergency and elective), consistent finding also reported by other researchers also [25-26].

CONCLUSION

IUGR is an important health problem of developing countries around the world. There are multiple causes for IUGR including maternal, fetal, placental, and genetic factors. Mothers with high risk factors for IUGR fetus should be followed up closely for any complications. The IUGR fetus needs an early diagnosis and management so that neonatal and perinatal mortality can be minimized.

REFERENCES

- American College of Obstetricians and Gynecologists. ACOG practice bulletin no. 134: fetal growth restriction. *Obstet Gynecol.* 2013; 121:1122–33.
- Metcoff J. Clinical assessment of nutritional status at birth. Fetal malnutrition and SGA are not synonymous. *Pediatr Clin N Am.* 1994; 41(5):875–91.
- Nardoza LM, Caetano AC, Zamarian AC, Mazzola JB, Silva CP, Marcal VM, et al. Fetal growth restriction: current knowledge. *Arch Gynecol Obstet.* 2017; 295(5):1061-77.
- Sharma D, Shastri S, Farahbakhsh N, Sharma P. Intrauterine growth restriction– part 1. *J Matern Fetal Neonatal Med.* 2016; 7:1–11.
- Pallotto EK, Kilbride HW. Perinatal outcome and later implications of intrauterine growth restriction. *Clin Obstet Gynecol.* 2006; 49(2): 257-69.
- Howson CP, Kinney MV, McDougall L, et al. Born too soon: preterm birth matters. *Reprod Health* 2013; 10 Suppl 1:S1.
- Kleijer ME, Dekker GA, Heard AR. Risk factors for intrauterine growth restriction in a socio-economically disadvantaged region. *J Matern Fetal Neonatal Med.* 2005;18:23–30
- Visentin S, Lapolla A, Londero AP, Cosma C, Dalfrà M, Camerin M, et al. Adiponectin levels are reduced while markers of systemic inflammation and aortic remodelling are increased in intrauterine growthrestricted mother-child couple. *Biomed Res Int.* 2014; 2014: 401595.
- Lausten-Thomsen U, Olsen M, Greisen G, Schmiegelow K. Inflammatory markers in umbilical cord blood from small-for-gestational-age newborns. *Fetal Pediatr Pathol.* 2014; 33(2): 114-8.
- Barker DJ. Adult consequences of fetal growth restriction. *Clin Obstet Gynecol.* 2006; 49(2): 270-83
- Maulik DEV. Fetal growth restriction: the etiology. *Clin Obstet Gynecol.* 2006; 49(2):228–35.
- Lin C.C., Shy Jon S., Philip L. River “Comparison of associated high risk factors and perinatal outcome between symmetric and asymmetric fetal IUGR” *Am. J. Obs & Gyn* 1991; 164(6): 1535-1541.
- Verhoeff F, Brabin B, Buuren SV, Chimsuku L, Kazembe P, et al. An analysis of intrauterine growth retardation in rural Malawi. *Eur J Clin Nutr.* 2001;55:682–9.
- Berendes HW, Fikree FF. Risk factors for term intrauterine growth retardation: a community-based study in Karachi. *Bull World Health Organ.* 1994; 72:581–7.
- Desalegn Tesfa*, Melaku Tadege, Alemayehu Digssie and Sofonyas Abebaw, Intrauterine growth restriction and its associated factors in South Gondar zone hospitals, Northwest Ethiopia, 2019, *Archives of Public Health* (2020) 78:89 <https://doi.org/10.1186/s13690-020-00475-2>
- Dapkekar P, Bhalerao A, Kawathalkar A, et al. (June 09, 2023) Risk Factors Associated With Intrauterine Growth Restriction: A Case-Control Study. *Cureus* 15(6): e40178. DOI 10.7759/cureus.40178
- Motghare DD, Vaz FS, Pawaskar AM, Kulkarni MS: Maternal determinants of intrauterine growth restriction in Goa, India: a case-control study. *Glob J Med Public Health.* 2014, 3:
- Ashwani N, Neela AR, Babu SM, Kumar CS, Pratap OT: Maternal risk factors associated with intrauterine growth restriction: hospital based study. *Int J Med Res Rev.* 2016, 4:2125-9. 10.17511/ijmrr.2016.i12.08
- Sinha S, Kurude VN: Study of obstetric outcome in pregnancies with intrauterine growth retardation . *Int J Reprod Contracept Obstet Gynecol.* 2018, 7:1858. 10.18203/2320-1770.ijrcog20181918
- Singh A, Ambujam K: Maternal socio-demographic determinants and fetal outcome of intrauterine growth restriction. *Int J Reprod Contracept Obstet Gynecol.* 2018, 7:3843-7. 10.18203/2320-1770.ijrcog20183805
- Thekkedathu VC. Maternal and placental risk factors associated with intrauterine growth retardation and the perinatal outcome journal of south Asia federation obstetrics and gynecologist. 2015;7:176–81
- SIDRA MAJEED, ASIFA KHAWAJA, N .A TUNIO, F. UNAR, FIZA ALI KHAN, To Determine Frequency of Intrauterine Growth Restriction in Pregnancy Induced Hypertension, *P J M H S* Vol. 14, NO. 2, APR – JUN 2020 340
- Kamphof HD, Posthuma S, Gordijn SJ, Ganzevoort W. Fetal Growth Restriction: Mechanisms, Epidemiology, and Management. *Maternal Fetal Med* 2022;4(3):186–196. doi: 10.1097/FM9.000000000000161
- Gidi NW, Goldenberg RL, Nigussie AK, et al. Incidence and associated factors of extrauterine growth

- restriction (EUGR) in preterm infants, a cross-sectional study in selected NICUs in Ethiopia. *BMJ Paediatrics Open* 2020;4:e000765. doi:10.1136/bmjpo-2020-000765
25. Subramanian S, Remadevi S, Subramaniam K. Prevalence, characteristics and maternal risk factors of small for gestational age fetuses in a tertiary care center from Kerala. *The New Indian Journal of OBGYN*. 2020; 7(1): 76-81
26. Sharma et al. Intrauterine Growth Restriction: Antenatal and Postnatal Aspects. *Clinical Medicine Insights: Pediatrics* 2016;10 67–83 doi: 10.4137/CMPed.S40070