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ORIGINAL RESEARCH

Risk Factors And Outcomes Of Fetal Growth Retardation- A Prospective Observational Study

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Abstract

Background And Objective: Fetal growth restriction (FGR) is a common and complex obstetric problem. FGR is noted to affect approximately 10-15 % of pregnant women. It is more prevalent in developing countries and resource poor countries. Despite the improvement in healthcare in India, FGR cases have been observed. Therefore, the purpose of this study was to determine the incidence, associated maternal risk factors of FGR babies, and study the neonatal outcome among these babies.

Method: This is a prospective observational study conducted in tertiary care hospital on 200 antenatal women diagnosed with FGR. Maternal risk factors for FGR such as anaemia, Pre-pregnancy weight, weight gain in pregnancy and medical disorders in pregnancy was studied. Outcomes of FGR babies- tachypnea of newborn, apgar score at 5 minutes, hyperbilirubinemia, hypoglycemia, sepsis, intraventricular haemorrhage, re-admission to intensive care was studied.

Result: Anaemia is an important risk factor for FGR. In this study, the mean Hb was 9.82+/- 3.44 gm/dL. In 42% of the study population, we observed that the Hb was less than 9 gm/dL. This correlated well with presence of FGR, and was statistically significant.

Similarly, there was a positive correlation between FGR and gestational hypertension, anaemia and pre-eclampsia

There was a significant positive correlation of neonatal outcomes with APGAR, tachypnoea of newborn, sepsis and IVH.

Conclusion: Anaemia and weight gain in pregnancy were significantly associated with FGR which needs to be addressed. Pre pregnancy counselling needs to be emphasised to achieve the same.

Key Words: anaemia, chronic hypertension, intraventricular haemorrhage, respiratory distress

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INTRODUCTION

The obstetric condition known as Fetal growth restriction (FGR) is a common and difficult issue to deal with. It has been observed that roughly 10-15% of pregnant women are affected by IUGR[1]. A significant number of developing nations have made the prevention of low birth weight a priority in terms of public health[2]. where the disease is primarily caused by fetal growth retardation, in contrast to prematurity in developed nations, when the condition is primarily caused by premature birth[3]. Low birth weight, also known as LBW, is a significant factor in determining the morbidity and mortality rates among children[4]. The consequence of this is that children who are born with a weight of less than 2.5 kilogrammes are at a greater risk of passing away throughout their early childhood[5,6]. The majority of infants who are affected by FGR are found in Asia, which accounts for roughly 75 percent of the total number of affected infants. Twenty percent of the cases are found in Africa, whereas five percent are found in Latin America. The prevalence of low birth weight (LBW) has been found to be 26% in India. The percentage of FGR has been determined to be 54%. Despite the fact that the bulk of low-income countries (LBW) are found in seven different countries, South

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Asia is the region where half of the children who were born with low birth weight were born, and among these nations, India and Bangladesh have the highest prevalence of low birth weight (30%)[8].

India, despite being a developing country, has come leaps and bounds in access to healthcare, and its infrastructure, thereby bridging the gap between various socioeconomic classes. Despite that, the prevalence of FGR remains high. Therefore, we performed the study with the aim to evaluate the maternal factors leading to FGR, and the neonatal outcomes of FGR babies

MATERIALS AND METHODS

This is a prospective observational study performed in a tertiary care centre. Pregnant mothers with babies of birth weight less than 2500 at term (37 weeks) and pregnant mothers diagnosed IUGR antenatally by ultrasound were included in the study after obtaining informed consent.

Those mothers with preterm babies, multiple pregnancy, uterine anomalies, congenital anomalous babies and who failed to give consent were excluded.

The study was performed from 1st January 2022 to 31st April 2024.

Institutional Ethical committee clearance was obtained.

Data regarding maternal determinants of FGR were obtained from charts. Following variables were studied: Gestational age at birth, Birth weight, Gender of baby, Prepregnancy weight, Weight gain in pregnancy, Number of antenatal check up, history of Anemia(<11g/dl), history of medical disorders of pregnancy including Gestational Hypertension, Gestational Diabetes Mellitus, Pre eclampsia, Antepartum haemorrhage including Placenta previa and Abruptio placenta, Previous bad Obstetric outcome like Still birth, Low birth weight baby, Abortions, Inter-pregnancy interval, History of chronic diseases, oligohydromnias including Borderline oligoamnios, and Doppler abnormalities diagnosed antenatally.

There were no dropouts from our study.

FGR babies were followed up postnatal. Neonatal outcomes resulting in neonatal Intensive care admission were studied.

The data was collected in a semi-structured proforma and entered into an MS excel spreadsheet.

It was then analysed using SPSS v26 (IBM corp) Categorical variables were represented as frequency and proportion, while categorical variables were represented as mean and standard deviation.

To compare between two independent means, student's t-test and ANOVA tests were used.

To compare to categorical variables, Chi Square, Mann Whitney test was used.

Correlation was performed using Pearson's correlation.

RESULTS

This study included 200 pregnant women after 37 weeks of gestation diagnosed with FGR.

We observed that majority of the patients had aged between 21-25 years (42%), with a mean age of 22.36+/- 8.91 years. 22 women were elderly patients, over the age of 35 years.

The pre-pregnancy weight was observed to be 58.22 +/- 19.03 kg. however, in 12%, we found that the weight was more than 80 kg, while in 15% the weight was less than 40 kg.

Table 1: Distribution of Weight Gain in Pregnancy (KG)

	Frequency	Percent	p – value
≤ 9	143	71.5%	<0.001
> 9	57	28.5%	

Weight gain during pregnancy could be indicative of the mother's nutritional status, underlying anaemia and FGR. In this study, 50% of patients were primigravida, while remaining had atleast one living offspring.

93.5% of the foetuses in the study had birth weight of 1.5-2 kg (LBW). Only the remaining 6.5% had VLBW(<1.5kg) babies.

Table 2: Distribution of Doppler Abnormalities

Doppler findings	Frequency	Percent
No Abnormalities	144	72%
Uterine Flow Increased Resistance	21	11.5%
Absent Diastolic Flow	14	7%
Reversed Diastolic Flow	8	4%
MCA Doppler Abnormalities	7	3.5%
Persistent Diastolic Notch	6	3%

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Foot note: MCA: middle cerebral artery

Anaemia is an important risk factor for FGR. In 42% of the study population, we observed that the Hb was less than 9 gm/dL. This correlated well with presence of FGR, and was statistically significant($p < 0.001$).

Similarly, there was a positive correlation between FGR and gestational hypertension, anaemia and pre-eclampsia

Table 3: Distribution of maternal risk factors

VARIABLES	R FACTOR	Percent
Gestational Hypertension	0.601	0.002
Anaemia	0.882	<0.001
Pre-eclampsia	0.735	0.0043
Gestational Diabetes Mellitus	-0.882	0.211
Hypothyroidism	0.322	0.063

The proportion of cases with no oligohydramnios (72%) is significantly higher compared to the cases with oligohydramnios (28%).

Table 4: Distribution of neonatal outcomes

Neonatal outcomes	R factor	P value
APGAR at 5 Minutes less than 7	0.472	0.045
Tachypnea of Newborn	0.578	0.005
Hyper Bilirubinemia	0.327	0.361
Hypoglycemia	0.301	0.062
Readmission in Intensive care	0.233	0.561
Sepsis	0.602	0.003
Intraventricular haemorrhage	0.662	0.002

Foot note: APGAR: appearance, pulse, grimace, activity, respiration

There was a significant positive correlation of neonatal outcomes with APGAR, tachynpnoea of newborn, sepsis and Intraventricular haemorrhage .

DISCUSSION

Fetal growth restriction, also known as FGR, is a condition in which the foetus does not attain its genetic development potential. This condition is deemed to be present when the weight of the foetus at delivery is less than the 10th percentile. As a consequence, the foetus is at a greater risk of postnatal morbidity and mortality. It is estimated that roughly 24 percent of neonates around the world are diagnosed with FGR each year. In this particular study, the purpose was to discover sociodemographic, medical, and obstetric risk variables that are related with fetal growth restriction (FGR).

It was observed that FGR was more among mothers of ages between 25-30 years.

Whereas similar study by Agarwal et al[10] low birth weight was more prevalent (58.5%) in age group less than 20 years, it was 36% in teen age mothers in a study by Kaushal et al[11]

FGR was more among mothers with prepregnancy weight of less than 50 kgs (43.5%) , which was statistically significant. Similarly Agarwal et al showed 76% of low birth weight in pre pregnancy weight < 50 kg . This finding was also observed by Mumbare et al[12], Edris et al[13], *and* Gebremedhin et al[14].

Percentage of FGR babies were more among mothers who had weight gain of less than 9kgs through out pregnancy, which was statistically significant. Similar findings were observed in study done by Malvankar et al[15]. The percentage of low birth weight foetuses was high among **primigravids**. Thus there was statistically significant association between parity of mother and birth weight of newborn baby. Agarwal et al[10], Kaushal et al[11], Som et al[16] and Das et al[17] found similar findings in their study, while Mumbare et al[14], Deshpande et al[18] and Dasgupta et al[19] did not find any association between parity and birth weight of baby.

FGR babies were more prevalent in mothers even though they had more than 5 antenatal visits. Most of our population are well aware of health care and hence attend to their ANC regularly. Kamaldoss et al[20] did not find any association between LBW and

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antenatal care, however Das et al[18] found significant association between antenatal care and birth weight.

It was found that mothers who had **anemia** were more prone to deliver a low birth weight baby, which was statistically significant. Mumbare et al[12] and Dasgupta et al[20] found statistically significant association between anemia and low birth weight. It was found that as the interval between previous and index pregnancy increased, there was favorable effect on the birth weight of the baby delivered in index pregnancy. Deshpande et al[18] and Das et al[17] found statistically significant association between low inter pregnancy interval and low birth weight.

We found a positive correlation between maternal anaemia, gestational hypertension and pre-eclampsia and FGR

Limitations of the study

Determination of all risk factors requires a larger sample group of subjects.

We have only studied the neonatal outcomes. Long term follow up of FGR babies needs to be done till adulthood.

Conclusion

Maternal risk factors significantly associated were younger age group, primigravida, prepregnancy weight of less than 50 kg, weight gain in pregnancy less than 9 kg, shorter inter-pregnancy interval, anemia, history of previous low birth weight.

Gender, previous history of abortions, antenatal visits, antepartum haemorrhage, medical disorders in pregnancy, chronic medical illness, oligohydromnias had no significant association with FGR

Similarly, There was a significant positive correlation of neonatal outcomes with APGAR, tachynpnoea of newborn, sepsis and IVH.

Though lot of advancements are made in health care, FGR babies continue to challenge developing countries. Detecting at risk mothers and proper follow up during pregnancy will result in decreasing the burden of FGR babies to parents and healthcare.

REFERENCES

1. Chauhan SP, Gupta LM, Hendrix NW, Berghella V. Intrauterine growth restriction: comparison of American College of Obstetricians and Gynecologists practice bulletin with other national guidelines. American journal of obstetrics and gynecology. 2009 Apr 1;200(4):409-e1.
2. Kramer MS. Determinants of low birth weight: methodological assessment and meta-analysis. Bulletin of the World Health Organization. 1987;65(5):663.
3. Villar J, Belizán J. The relative contribution of prematurity and fetal growth retardation to low birth weight in developing and developed societies. American journal of obstetrics and gynecology. 1982 Aug 1;143(7):793-8.
4. Lawn JE, Cousens SN, Darmstadt GL, Bhutta ZA, Martines J, Paul V, Knippenberg R, Fogstad H. 1 year after The Lancet Neonatal Survival Series —was the call for action heard?. The Lancet. 2006 May 6;367(9521):1541-7.
5. Alexander GR, Wingate MS, Bader D, Kogan MD. The increasing racial disparity in infant mortality rates: composition and contributors to recent US trends. American journal of obstetrics and gynecology. 2008 Jan 31;198(1):51-e1.
6. LEE MA. Epidemiology of preterm delivery. Korean Journal of Perinatology. 1993:46-56.
7. Saleem T, Sajjad N, Fatima S, Habib N, Ali SR, Qadir M. Intrauterine growth retardation-small events, big consequences. Italian journal of pediatrics. 2011 Dec;37:1-4.
8. Wardlaw TM, editor. Low birthweight: country, regional and global estimates. UNICEF; 2004.
9. Brämer GR. International statistical classification of diseases and related health problems. Tenth revision. World health statistics quarterly. Rapport trimestriel de statistiques sanitaires mondiales. 1987 Dec;41(1):32-6.
10. Agarwal K, Agarwal A, Agrawal VK, Agrawal P, Chaudhary V. Prevalence and determinants of" low birth weight" among institutional deliveries. Annals of Nigerian Medicine. 2011 Jul 1;5(2):48.
11. Kaushal SK, Misra SK, Gupta SC, Singh R. A Study of Maternal Factors And Birth Weight In A Border District Of Uttar Pradesh. Indian Journal of Community Health. 2012 Jul 19;24(2):86-90.
12. .Mumbare SS, Maindarkar G, Darade R, Yenge S, Tolani MK, Patole K. Maternal risk factors associated with term low birth weight neonates: a matched-pair case control study. Indian pediatrics. 2012 Jan 1;49(1):25-8.
13. Edris M, Erakli G. The prevalence of low birth weight and factors associated with low birth weight delivery in Gondar Region, north west Ethiopia.
a. ETHIOPIAN JOURNAL OF HEALTH DEVELOPMENT. 1996;10:149-52.
14. Gebremedhin M, Ambaw F, Admassu E, Berhane H. Maternal associated factors of low birth weight: a hospital based cross-sectional mixed study in Tigray, Northern Ethiopia. BMC pregnancy and childbirth. 2015 Sep 17;15(1):1.
15. Mavalankar DV, Gray RH, Trivedi CR. Risk factors for preterm and term low birthweight in Ahmedabad, India. International journal of epidemiology. 1992 Apr 1;21(2):263-72.
16. .Som S Jr, Pal M, Adak DK, Gharami AK, Bharati S, Bharati P. Effect of socioeconomic and biological variables on birth weight in Madhya Pradesh. Malays J Nutr. 2004 Sep;10(2):159-71. Epub 2004 Sep 15. PubMed PMID: 22691737. [PubMed]
17. Das JC, Paul N. Association of maternal socio-biological factors with birthweight of newborn baby. Journal of Chittagong Medical College Teachers' Association. 2008;19(1):37-42.
18. Deshpande Jayant D, Phalke DB, Bangal VB, D Peeyuusha BS. Maternal risk factors for low birth weight neonates: a hospital based case control study in rural area of western maharashtra, India. National Journal of Community Medicine. 2011 Oct;2(3):394-8.
19. Dasgupta A, Basu R. Determinants of low birth weight in a Block of Hooghly, West Bengal: A multivariate analysis. Int J Biol Med Res. 2011;2(4):838-42.

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DOI: 10.69605/ijlbpr_13.9.2024.22

20. Kamaladoss T, Abel R, Sampathkumar V. Epidemiological co-relates of low birth weight in rural TamilNadu. The Indian Journal of Pediatrics. 1992 May 1;59(3):299-304.

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