Original Article ▌

A CASE CONTROL STUDY TO ELUCIDATE MATERNAL DETERMINANTS OF INTRA UTERINE GROWTH RETARDATION IN A TERTIARY CARE HOSPITAL OF SAGAR CITY OF MADHYA PRADESH

Pandey Shikha [1], Pandey Ramesh [2]

Author's Affiliation:
[1]Assistant Professor, Department of Obstetrics and Gynecology,
[2]Assistant Professor, Department of Medicine, Bundelkhand Medical College (BMC), Sagar, Madhya Pradesh, India

Correspondence:
Dr. Shikha Pandey
Type 2/8 IInd Floor, Medical College Campus, Sagar (M.P.)
E-mail: drshikhatp.97@gmail.com

ABSTRACT

Objectives: To study the maternal determinants of intrauterine growth retardation among cases admitted for delivery in Bundelkhand Medical College, Sagar.

Methods: A Case-control study was conducted in the year January 2010 to December 2010 in Bundelkhand Medical College (BMC) Sagar M.P. The participants included mothers who underwent normal delivery in BMC Sagar. Mother's age, parity, maternal height, maternal weight, body mass index, hemoglobin level during pregnancy, birth weight of the baby were considered as study variables. Intrauterine growth retardation was taken as outcome variable. Chi square test. OR's with 95% CI was used as the method of statistical analysis.

Results: Significant risk factors identified in univariate analysis included maternal height (<145 cm s.), maternal weight (<45 kg s.), body mass index (<18.5) and anemia in pregnancy. Multiple logistic regression analysis revealed that maternal age (>30 years), primiparity, maternal height (<145cms.) maternal weight (<45 kg s.), anemia in pregnancy (Hb <11gm %) is the significant risk factors of intrauterine growth retardation.

Key words: Intra Uterine Growth Retardation, Neonate, haemoglobin, pregnency

INTRODUCTION

The prevention of low birth weight is a public health priority in many developing countries[1] where the condition is largely attributed to intrauterine growth retardation as compared to prematurity in developed countries[2]. Prematurity and intrauterine growth retardation has different risk factors and different prognosis for infant survival and long term morbidity. There have been few population-based studies on low birth weight, especially those designed

to distinguish between prematurity and intrauterine growth retardation. Those that have been conducted have often had an inadequate control and lack of statistical power, resulting in inconclusive evidence for determinants of intrauterine growth retardation in developing countries.

IUGR is observed in about 23.8% of the newborn and approximately 30 million babies suffer from IUGR every year[3]. The prevalence of low birth weight in India was found to be 26%[4]. The proportion of IUGR was found to be 54.2% in India[3].

The factors that have been postulated to influence the risk of intrauterine growth retardation among the newborn in the developing countries include pre-pregnancy weight, maternal age, maternal education, gestational weight gain, tobacco chewing, calorie intake during pregnancy, maternal height, socio-economic conditions, general morbidity, birth interval, strenuous maternal work, parity, sexual activity during pregnancy, urinary tract infection, first antenatal visit, number of antenatal visits and quality of antenatal care[5,6]. However in developing countries evidence on the association between these factors and IUGR among newborns is scarce. A case-control study was therefore conducted to elucidate some of the major risk factors for intrauterine growth retardation among newborns.

MATERIAL AND METHODS

This case control study was conducted in BMC Sagar M.P. A total of 101 cases and 202 controls were selected in the study from 1st January 2010 to 31st December 2010. This gives a power of 80% for detecting an OR>2.1 as significant at 5% level if the prevalence of exposure among controls is between 20 to60.

Cases were all the singleton newborn children with intrauterine growth retardation delivered in BMC Sagar during the study period. Intrauterine growth retardation was defined as occurring if the birth weight was below 10th percentile for gestational age on the chart of fetal growth developed by Brenner ET al[7].

Controls were singleton newborn babies who were appropriate for gestational age and were delivered in the BMC Sagar during the study period. After the selection of each case as defined, the next available 2 newborns that had fulfilled the criteria for controls given above were selected and included in the control group. This ensured a case: control ratio of 1:2.

Data collection

Antenatal Records of the patients who delivered in BMC from January to December 2010 were scrutinized for completeness of history and case write up. Pregnancy outcome recorded in terms of LBW, IUGR, stillbirths were scrutinized and cases were selected. Information relating to maternal, socio-demographic and obstetric factors was obtained from the case records, which included age, parity, maternal height, maternal weight and hemoglobin level.

Data analysis

Data was analyzed by the use of Epi-Info 5.1 software. Odds ratios with 95% confidence intervals were calculated. Since intrauterine growth retardation is a multifactorial condition and many of the factors are inter-related, we used a multiple logistic regression analysis to assess their independent effects.

RESULTS AND DISCUSSION

Table 1 presents the risk factors of intrauterine growth retardation on univariate analysis with OR and 95% confidence interval. Among the maternal factors: maternal malnutrition including maternal weight (<45kg.) maternal height (<145cm) and body mass index (<18.5) were significantly associated with IUGR. These findings are consistent with Kramer's meta-analysis[1] and studies conducted in various developing countries[5,6,8,9]. In our study, maternal age had no significant association with IUGR. Our findings on maternal age as a risk factor is consistent with studies conducted Mavalankar et al[6] in India and Fikree et al[8] in Pakistan but a study conducted by Ferraz et al[5] in Brazil has shown that young maternal age (<20 years) is a significant risk factor of IUGR. Proportion of primigravida was high among cases as compared to control but the difference was not statistically significant. In contrast, studies conducted in India[6] and Pakistan[8] have revealed that primiparity is significantly associated with IUGR. In our study, on univariate analysis anemia in pregnancy (Hb <11 gm %) was significantly associated with IUGR. But this finding was in contrast with Kramer's meta-

analysis1 and studies conducted in various developing countries.

Table 1: Uni-variate Analysis showing the Maternal Risk Factors for IUGR

Maternal factors	Cases (n=101)	Controls (n=202)	Odd Ratio (95%CI)
Age of the mother			
≤19 years	6 (5.9)	12 (5.9)	1.07 (0.39-2.96)
20-30 years	77 (76.2)	165 (81.7)	1
>30 years	18 (17.8)	25 (12.4)	1.54 (0.8-3.0)
Parity			
Primigravida	44 (43.6)	68 (33.7)	1.52 (0.93-2.48)
Multigravida	57 (56.4)	134 (66.3)	1
Maternal Height			
<145 cm	14 (13.9)	7 (3.5)	4.48 (1.75-11.5)
≥145 cm	87 (86.1)	195 (96.5)	1
Maternal weight			
<45 kg	29 (28.7)	11 (5.4)	7.0 (3.3-14.73)
≥45 kg	72 (71.3)	191 (94.6)	1
BMI			
<18.5	12 (11.9)	10 (5.0)	2.59 (1.08-6.25)
≥18.5	89 (88.1)	192 (95.0)	1
Anemia			
< 11g%	69 (76.7)	104 (60.5)	2.15 (1.21-3.82)
≥ 11g%	21 (23.3)	68 (39.5)	1

(Figure in parenthesis indicate percentage)

Among the risk factors which influenced IUGR, maternal height (<145cms), maternal weight (<45kgs.), body mass index (<18.5) and anemia in pregnancy (Hb<11 gm s %) were found to be strongly associated with IUGR by univariate analysis. Age of the mother and parity were not significantly associated with IUGR. All these factors were subjected to multiple logistic regression analysis.

Table 2 presents the results of multiple logistic regression analysis showing the determinations of IUGR with adjusted OR and 95% confidence interval. The significant determinants identified for IUGR were age >30 years, primiparity, maternal height (<145 cm s.), maternal weight (<45 kg s) and anemia in pregnancy (Hb<11 g %). Mavlankar ET al[6] in India. Fikree et al[8] in Pakistan and Ferraz ET al[5] in Brazil reported that advanced maternal age (>30 years) and anemia in pregnancy had no significant association with IUGR. Our findings on primiparity, maternal height (<145 cm s.), maternal weight (<45 kg s) are consistent with various studies conducted in developing countries[5, 6].

Table 2: Significant Determinants of IUGR - Results of Multiple Logistic Regression

Maternal factors	OR (95% CI)	p-value
Parity		
Primigravida	2.0 (1.13-3.8)	0.018
Multigravida	1	
Height		
<145 cm	4.27 (1.49-12.24)	0.007
>145 cm	1	
Weight		
<45 kg	7.04 (2.87-17.29)	0.001
≥45 kg	1	
Anemia		
<11g%	2.13 (1.15-3.95)	0.01
≥11g%	1	

It was a hospital record based study providing interesting information, which can be helpful in planning maternal and child health services in rural areas. We recommend strengthening the maternal health programs focusing on maternal nutrition and iron and folic acid supplementation during antenatal period.

REFERENCES

1. Kramer M.S. Determinants of low birth weight: Methodological assessment and metaanalysis. Bull WHO 1987; 65:663-737.

2. Villar J, Belizan J. The relative contribution of prematurity and fetal growth retardation to low birth weight in developing countries. Am J Obstet Gynecol 1982; 143:793-98.

3. Gupta PC, sreevidya S. smokeless tobacco use, birth weight and gestational age; population based prospective cohort study of 1217 women in Mumbai India, BMJ 2004 ;328:1538-45.

4. WHO (1995) Bridging the gaps. The World Health Report 1995. Report of the Director General.

5. Ferraz EM, Gray RH, Cunha TM. Determinants of preterm delivery and intrauterine growth retardation in north-east Brazil. Int J Epidomiol; 19:101-08.

6. Mavlankar DV, Gray Ronald H, Trivedi CR. Risk factors for preterm and term low birth weight in Ahmedabad, India. Int J Epidemiol 1992; 21:263-72.

7. Brenner WE, Edelman DA, Hendricks CH. A standard of fetal growth for the United States of America. Am J Obstet Gynecol 1976; 126:555-64.

8. Fikree FF, Berenes HW. Risk factors for term intrauterine growth retardation Community based study in Karachi. Bull WHO 1994; 72(4)581-87.

9. Pelletier D et al. Maternal anthropometry predictors of IUGR and prematurity in Malawi Maternal and Child Nutrition study. Bull WHO OMS Supplement 1995; 73:81.