

Original Article

OBSTETRIC RISK FACTORS FOR LOW BIRTH WEIGHT AMONGST FULL TERM BABIES BORN AT A TERTIARY CARE HOSPITAL OF BELGAUM DISTRICT, SOUTH INDIA

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INTRODUCTION

Low Birth Weight is a multifaceted socio- medical and public health problem.¹ It is one of the reliable indicator to measure the success of maternal and child health programs.² It is estimated that every year 15.5% of all global live births born with the Low Birth Weight (LBW); out of which more than 95% LBW infants born in developing countries.³ South Central Asia has the highest prevalence (almost 50% of all global LBW babies) of LBW^{3,4}; wherein India contributes (40% of all Asian low birth weight) to the highest proportion amongst all the Asian countries.³ There is the large state-wide variation (lowest in north east and highest in north)⁵ in the prevalence of LBW in India with the average national estimate remains as high as 28%.⁶

ABSTRACT

Introduction: Low Birth Weight is a multifaceted socio- medical and public health problem, especially in developing countries where Intrauterine Growth Retardation remains major manifestation. This study was carried out to identify obstetric risk factors for Low Birth Weight amongst full term babies born at a tertiary care hospital.

Methodology: This was the retrospective record-based study, carried out at the Dr P.K Charitable Hospital of Belgaum district, South India. Records of all consecutive full term (≥ 37 weeks of gestation) singleton live births occurring during the period from 1st April-September 31, 2012 was examined to obtain relevant information.

Results: A total of 1299 women delivered singleton live births at full term during the stipulated time period. Mean maternal age was 23.28 ± 3.39 years, 53% were primi-gravida and 48.8% were high risk pregnancy. Low birth weight (LBW) was prevalent amongst 19.3% new born. Among the independent significant factors associated with the LBW, primigravida, hypertensive mothers, non cephalic presentation, female baby had 1.31, 1.96, 2.89 and 1.33 times higher odds of delivering/having LBW as against multigravida, normotensive mothers, cephalic presentation and male baby respectively.

Conclusions: Primigravida, hypertensive disorders during pregnancy, fetal presentation at delivery and sex of the new born were significantly associated with the LBW. Early identification, monitoring and management of hypertensive disorders during pregnancy eventually reduce the LBWs attributable to hypertension.

Key-words: Obstetrics, Risk factors, Low birth weight, Full term, Tertiary care, South India

LBW is a multi-factorial phenomenon of enormous medical, societal and financial problem.^{5,7,8} It may results either due to the baby is born prematurely (< 37 weeks of gestation) or due to Intrauterine Growth Retardation (IUGR).³ Evidences suggest that the low weights at birth in majority of the developing countries are due to IUGR as against the preterm births in developed countries.^{9,10} There are more than forty three factors known to have detrimental effects on birth weight; out of them maternal environment is one of the most important predictor.^{9,11}

In spite of the special attention has been paid to the maternal and child health care, India has been lagging behind in achieving the target of Millennium Development Goal-4 of reducing the infant mortality.^{12,13} Although, LBW is one of the major contributor of the

prenatal survival, physical and mental growth and a strong predictor of adulthood morbidities;^{4,14} Indeed, it has not been designated as the indicator to monitor progress of MDG 4. This may be due to the paucity of reliable data pertaining to the birth weight and its specific determinants. In this context, this study was carried out to identify the obstetrics risk factors for Low Birth Weight amongst full term babies born at a tertiary care hospital in Belgaum, South India.

MATERIALS AND METHODOLOGY

A retrospective record-based study was carried out at the department of Obstetrics and Gynaecology, Dr P.K. Charitable Hospital of Belgaum district, Karnataka. It is the largest, multi facility tertiary care hospital of Belgaum district which is a constituent organization of the Jawaharlal Nehru Medical College of Belgaum, Karnataka, South India. After taking permission from hospital authority, records of all consecutive full term (≥ 37 weeks of gestation) singleton live births occurring during the period from 1st April–September 31, 2012 were examined to obtain information regarding new born weight and pregnancy related factors from the delivery and birth registers. Data were analyzed using SPSS 20.0 trial version. Descriptive statistics, Chi-square and Odds Ratio were calculated. Multivariate regressions were applied to infer the risk associated with each of the factors. P value < 0.05 was considered statistically significant.

RESULTS

This record based review made known that 1758 women delivered in the study hospital during April–September 2012. Out of those hospital deliveries, 1299 (73.89%) delivered the singleton live birth at full term. Mean gestational age at delivery was 39.08 ± 1.61 weeks.

Background characteristics: Almost two-third (63%) pregnant women were 20-24 years and their mean age at delivery was 23.28 ± 3.39 years. Majority women were from urban area (53.7%), Hindus (92.2%) and more than half of them were primi-gravida. Almost three-quarters had taken antenatal care (ANC) and almost half of all were high risk pregnancies. Amongst the new born, male (52.7%) were more than female (47.3%) as shown in table-1.

Distribution of birth weight (n=1299): Out of all 1299 full term singleton live births, almost one-fifth (19.3%) babies had low birth weight (< 2500 gm). Of total 251 LBW babies, 9(3.58%) had very low birth weight (birth weight < 1500 gm) and 241(96.41%) had birth weight between 1500-2499 gm.

Association between birth weight and covariates: Higher proportions of LBW babies were born to the adolescent and elderly mothers as compared to the mothers of 20-24 years age ($p=0.08$). Babies born to the rural women (residents of out of municipal and can-

tonment boards) ($p=0.1$), mothers with the previous history of still birth ($p=0.08$) and LBW ($p=0.4$) had delivered slightly higher numbers of LBW babies; however, none of these factors are statistically significant. Primi-gravida had delivered significantly higher proportion of LBWs as against the multigravida ($p=0.02$). On the contrary, mothers with the previous history of caesarean section had delivered significantly lower proportion of LBW ($p=0.03$). History of abortion did not show any statistical association with the occurrence of low birth weight (table 2).

Table 1: Background characteristics (n=1299)

Variables	Numbers (%)
Age(in years)	
≤19	86 (6.6)
20-24	819 (63)
25-29	320 (24.6)
30-34	60 (4.6)
≥35	14 (1.1)
Mean age \pm SD= 23.28 ± 3.39	
Residence	
Rural	601 (46.3)
Urban	698 (53.7)
Religion	
Hindu	1198 (92.2)
Muslim	98 (7.5)
Christians	3 (0.2)
Gravida	
1	688 (53)
2	390 (30)
3	179 (13.8)
≥4	42 (3.2)
Antenatal registration	
Unregistered	338 (26)
Registered	961 (74)
Maternal risk category	
High risk	634 (48.8)
Low risk	665 (51.2)
Sex of the new born	
Female	615 (47.3)
Male	684 (52.7)

Figures in the parenthesis indicate the percentage

An association between present pregnancies related variables and the low birth weight is depicted in table 3. There was small numerical difference in the proportion of low birth weight babies born to the mothers who had and had not ANC care during the pregnancy ($p=0.5$). Meanwhile, high risk mothers ($p=0.008$) and the mothers those who had hypertensive disorders during the current pregnancy had delivered significantly higher portion of low birth weight babies ($p=0.001$). Premature Rupture of membrane (PROM) did not make any statistical difference in the occurrence of LBW ($p=0.2$). Additionally, significantly higher proportions of the LBW babies were born to a mother who had other than cephalic presentation ($p=0.002$). Significantly, LBW was more frequently observed among the female child as against the male new born ($p=0.01$).

Table 2: Association between participant’s characteristics and birth weight (n=1299)

Obstetric Factors	Birth weight (in grams)		Statistics
	LBW (≤2499)	Normal (≥2500)	
Maternal age			
≤19	24(27.9)	62(72.1)	p=0.08 (df=4)
20-24	161(19.7)	658(80.3)	
25-29	55(17.2)	265(82.8)	
30-34	7(11.7)	53(88.3)	
≥35	4(28.6)	10(71.4)	
Residence			
Rural	127(21.1)	474(78.9)	p=0.1
Urban	124(17.8)	574(82.2)	
Gravida			
primi-gravida	149(21.7)	539(78.3)	p=0.02* OR=1.37
multi-gravida	102(16.7)	34(83.3)	
History of Still birth (n=611)			
Yes	5(33.3)	10(66.7)	p=0.08
No	97(16.3)	499(83.7)	
History of delivery of LBW (n=611)			
Yes	7(21.2)	26(78.8)	p=0.4
No	95(16.4)	483(83.6)	
History of caesarean section (n=611)			
yes	25(12.2)	180(81.8)	p=0.03* OR=0.53
No	77(19)	329(81)	
History of abortion (n=611)			
yes	17(15)	96(85)	p=0.6
No	85(17.1)	413(82.9)	

Figures in the parenthesis indicate the percentage. Reference category: Multi-gravida, no history of Caesarean section

Level of risk associated with each of the significant factors identified for LBW was estimated by the Odds Ratio. Univariate analysis revealed that previous history of caesarean section had an inverse association with the LBW. Except maternal risk status, which was significant at the univariate analysis, primigravida,

hypertensive disorders, foetal presentation, and the sex of new born were found to be the independent risk factors associated with the LBW i.e. hypertensive mothers had more than two times risk of delivering LBW baby, foetal presentation other than cephalic had 2.89 times higher risk of LBW and the female child carried 1.33 times higher risk of having LBW than the male child respectively (table 4).

Table 3: Associations between current pregnancy related variables and low birth weight

Status	Birth weight (grams)		Statistics
	LBW (≤2499)	Normal (≥2500)	
Registration status			
Unregistered	69(20.4)	269(79.6)	p=0.5
Registered	182(18.9)	779(81.1)	
Risk status			
High risk	140(22.1)	494(77.9)	p=0.008* OR=1.41
Low risk	111(16.7)	554(83.3)	
Maternal haemoglobin before delivery			
Anaemic(<11 mg/dl)	1459(19.7)	585(80.1)	p=0.1
Normal (≥11 mg/dl)	106 (18.6)	463(81.4)	
Hypertensive disorders			
Yes	32(33)	65(67)	p=0.001* OR=2.21
No	219(18.2)	984(81.8)	
PROM			
Yes	19(24.4)	59(75.6)	p=0.2
No	232(19)	989(81)	
Foetal presentation			
Other than cephalic	14(40)	21(60)	p=0.002* OR=2.88
Cephalic	237(18.8)	1027(81.2)	
Sex of the new born			
Female	136(22.1)	479(77.9)	p=0.01* OR=1.4
Male	115(16.8)	569(83.2)	

Figures in the parenthesis indicate the percentage; Reference category: low risk, absence of hypertensive disorders, cephalic presentation and male sex of the baby.

Table 4: Multivariate logistic regression analysis

Variables	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
Primi Vs multi-gravida	.323	.149	4.720	1	0.030*	1.381	1.032	1.848
High risk Vs Low risk	.229	.155	2.176	1	0.14	1.257	.928	1.705
Hypertensive disorders	.675	.245	7.587	1	.006*	1.963	1.215	3.173
Fetal Presentation	1.003	.362	7.690	1	0.006*	2.726	1.342	5.537
Female Vs male baby	.329	.143	5.277	1	0.022*	1.389	1.049	1.839
Constant	-3.129	.889	12.393	1	0.001*	.044	-	-
Omnibus Tests					0.001*	Nagelkerke R Square=0.39		
Hosmer Lemeshow					0.973			

Reference OR=1, Variables entered in final model: Gravida, risk status, hypertensive disorders, foetal presentation and sex of the new born.

DISCUSSION

Low weight at birth amongst the full term new born has paramount importance in the clinical practices and research. Understanding the etiological differences of premature and full term low birth weight might be the useful guide in clinical case management. In pertinent to the clinical significance, present study was carried out with an aim to estimate the occurrence of low birth weight and to evaluate the potential obstetric risk factors responsible LBW amongst the full term new born.

In the present study, mean maternal age at delivery was 23.28±3.39 years which is lower than that was re-

ported in an Iranian study conducted at the maternity hospitals of Tehran (25.7± 5.3 years).¹ Slight variations in the average age might be due to higher proportion of the subjects below 25 years in our study as against Iranian study.

Mean gestational age at delivery was 39.08±1.61weeks. This finding corresponds with an Iranian study (39.03±1.36 weeks).¹ Almost one-fifth (19.3%) babies born at full term had low birth weight. Our findings are lower than the Sachin et al observed in Maharashtra (26.8%)⁷ and 21.5% observed in Indian National Family Health Survey-3;¹⁵ while about 5% of term births

were LBW in the studies conducted in Iran and Pakistan.^{1,16} These differentiations indicate the needs to identify the determinants of such variations. Primigravida had delivered significantly higher proportion of LBWs as against the multigravida which are in agreement with other Indian studies.^{7,11} Significantly low proportion of LBWs were born to the mothers with the earlier history of caesarean section ($p=0.03$). High risk mothers and the mothers those who had hypertensive disorders during the current pregnancy had delivered significantly higher portion of low birth weight babies. Similar findings were reported from Iran, India, Pakistan and Tanzania.^{1,7,11,16,17} Similarly, significantly higher proportions of the LBW babies with were born to the mothers who had other than cephalic presentation and more frequently observed among the female child as against the male new born.¹⁷

Although, maternal age at delivery and anaemia have been reported to be the significant factors affecting the birth weight,^{1,7,11,16,17} our study did not show the independent effects of these factors over the birth weight.⁷ Primigravida, hypertensive disorders, fetal presentation, and the sex of new born were found to be the independent risk factors associated with the LBW. Hypertensive mothers had almost two times risk of delivering LBW baby. Findings of the present study corroborate with similar studies conducted at the national and international level i.e. Mothers with the hypertensive disorders during pregnancy carries more than double fold risk for delivering low birth weight consistently.^{1,7,11,16,17} Fetal presentation other than cephalic carried 2.89 times higher odds for LBW. Female child carried 1.33 times higher risk of having LBW than the counterpart male child which are in agreement with the Tanzanian study (OR, 1.35).¹⁷

LIMITATIONS

Limitations of the retrospective study are inherent in this study and only well recorded selected risk factors were studied.

CONCLUSIONS

Low birth weight was observed amongst 19.3 percent full term new born. Primigravida, presence of hypertensive disorders during pregnancy, fetal presentation at delivery and the fetal sex were the found to be significantly associated with the LBW. Early identification, monitoring and management of hypertensive disorders during pregnancy will eventually reduce the LBWs attributable to these conditions during pregnancy.

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