



A Prospective study on the effects & prevalence of maternal, fetal & placental risk factors on low birth weight neonates

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Abstract

Background: Maternal, foetal and placental risk factors have a causative effect in the prematurity and failure to thrive in the early infantile period. Timely diagnosis helps in the anticipation of complications specific to risk factors and managing by impairing their harmful effects on the growth and development of the baby.

Methods: The study was conducted prospectively from January 2018 to July 2018. Neonates (n=361) weighting less than 2.5 kilograms were observed for risk factors and maturity estimation by Dubowitz scoring.

Results: Out of 1040 babies born from January to July 2018, 341 babies weight less than 2.5 kg. Out of which 162 (44.88%) babies were born preterm. Of the full term births 52% were low birth weights. The risk factors of the neonates are not mutually exclusive. In the present study 28 maternal risk factors were studied. The prevalence of maternal, fetal and placental risk factors was 85.32%, 74.79% and 6.65% respectively.

Discussion: India tops the list of 10 nations contributing around 60% of premature deliveries. Previous pre-term delivery, periodontitis, oligohydramnios, gestational diabetes mellitus and maternal short stature were risk factors for pre-term birth, while periodontitis, gestational hypertension and genital infection during the later stages of pregnancy were the independent risk factors for low birth weight.

Conclusion: Period prevalence of low birth weight babies and prematurity is 34.71% and 15.58% respectively. Risk factors are not independent to each other with maternal and foetal risk factors have almost have an effect on nearly three fourths of low birth weight neonates.

Keywords: Low birth weight babies, maternal, fetal and placental risk factors.

Introduction

Neonatal mortality rate occupies a major portion of infant mortality rate ⁽¹⁾. This is attributed to special problem among neonates, especially congenital anomalies, respiratory tract infections, acute diarrhoeal diseases and skin infections⁽²⁾.

The increased rate of infections is due to immature immune system and poor functions of integumentary system when compared to those functions in the adults. However, these functions are even more impaired especially in the preterm infants. Preterm biology is unique and considered

as an equivalent to immune-compromised state despite it is their normal physiology⁽³⁾. Newer advancements in neonatology and foetal medicine aids in the better delivery of health care thereby reducing the neonatal fatality due to prematurity⁽⁴⁾. Maternal, foetal and placental risk factors have a causative effect in the prematurity and failure to thrive in the early infantile period⁽⁵⁾. These factor either independently or harmoniously with other variables have a deleterious effect on the early part of first year of life⁽⁶⁾. Timely diagnosis helps in the anticipation of complications specific to risk factors and managing by impairing their harmful effects on the growth and development of the baby⁽⁷⁾.

Methods

The study was conducted prospectively in Department of Paediatrics, Rajah Muthiah Medical College & Hospital, Chidambaram from January 2018 to June 2018. Neonates (n=361) weighting less than 2.5 kilograms with parental informed consent are included, whereas those with severe congenital anomaly, systemic disease or

infection were excluded from the study. Various known maternal, placental and foetal risk factors are observed during the course of the study. The gestational age of the infants was estimated using modified Dubowitz scoring. Other factors like mode of delivery of the babies were also noted. Statistical analysis (descriptive statistics) was done by using Microsoft word 2010.

Results

During the study period, 1040 babies were born in which 361 low birth weight babies were included in the study. Period prevalence of low birth weight babies is 34.71%. Out of which 162 (44.88%) babies were born preterm. Among the preterm babies, the prevalence of extreme, early and late preterm was 30.47% (n=11), 13.85% (n=50) and 27.98% (n=101). In the present study, twenty eight risk factors were analyzed. The risk factors of the neonates are not mutually exclusive. The prevalence of maternal, fetal and placental risk factors was 85.32%, 74.79% and 6.65% respectively with their distribution in the table-4.

Table-1: Birth weight distribution among neonates

Birth weight (Kg)	Preterm		Term	
	Number (n)	Percentage (%)	Number (n)	Percentage (%)
Extremely LBW (<1000 gms)	7	1.9		
Very LBW (1001 - 1500 gms)	22	16%		
LBW (1501 - 2500 gms)	142	39%	190	52%

Table-2: Distribution of maternal risk Factors among low birth weight babies

S.No	Maternal risk factors	Preterm (n)	Preterm %	Term (n)	Term %	Total (n)	Total %
1	Anemia	2	.5	11	85	13	3.6
2	Pregnancy induced hypertension	9	2.4	17	4.7	26	7.2
3	Gestational diabetes	6	1.65	9	2.4	15	4.1
4	Hypothyroid	8	2.2	10	2.7	18	4.9
5	Eclampsia	1	.2	2	.55	3	.83
6	Pre-eclampsia	5	1.3	4	1.1	9	2.4
7	Seizure disorder	-	-	1	.27	1	.22
8	Varicella	-	-	1	.27	1	.27
9	HBsAg positive mother	1	.2	-	-	1	.27
10	TORCH infections	1	.2	-	-	1	.22
11	Oligohydraminos	26	7.2	53	14.6	79	21.88

12	Prolonged rupture of membranes	19	5.2	23	6.4	42	11.63
13	Chronic hypertension	3	.8	1	.2	4	1.1
14	Cervical fibroid	1	.2			1	.2
15	Short primi	2	.5	1	.2	3	.83
16	Rh negative	2	.5	5	1.3	7	1.9
17	Breech	2	.5	3	.8	5	1.3
18	Polyhydraminos	6	1.6	14	3.8	20	5.5
19	Heart disease	-		3	.8	3	.83
20	Asthma	1	.21	2	.8	3	.83
21	Teenage pregnancy	1	.21	-	.2	1	.2
22	Overt Diabetes	2	.5	1	.8	3	.83
23	VDRL positive mother	-	-	1	.2	1	.2
24	Infertility	4	1.1	-	.3	4	1.1
25	Renal calculi	-		1	.2	1	.2
26	UTI	1	.2	1	.25	2	.55
27	Pulmonary tuberculosis	1	.2	-	.2	1	.2
28	Lower respiratory infections	1	.2	2	.3	3	.83

Table-3: Dubowitz scoring distribution table

S.No	Dubowitz score	Number (n)	Percentage (%)
1	28-30 weeks	11	3.05
2	30-32 weeks	18	4.99
3	32-34 weeks	32	8.86
4	34-36 weeks	101	27.98
5	36-38 weeks	199	55.12

Table-4: Distribution of Foetal Placental Risk Factors among Low Birth Weight Babies

Placental risk factors	Pre-term		Term		Total	
Placenta previa	2	0.55	10	2.77	12	3.32
Abruptio placenta	4	1.11	1	0.28	5	1.39
Fetoplacental insufficiency	2	0.55	5	1.39	7	1.94
Fetal risk factors	Pre-term		Term		Total	
Pre-term	158	43.77	0	0.00	158	43.77
IUGR	0	0.00	48	13.30	48	13.30
VLBW	32	8.86	0	0.00	32	8.86
Twin	19	5.26	5	1.39	24	6.65
Congenital defects	5	1.39	2	0.55	7	1.94
TORCH infections	1	0.28	0	0.00	1	0.28

Discussion

UNICEF’s data implies that about 28% of babies of India are born low in birth weight. In India 6 to 8 million low birth weights are yearly. Of these 7.5 million babies, 60% are term with foetal growth retardation while the remaining 40% are pre-term. Action report on preterm birth in India 2013 documented that the country accounted for 3.6 million viz., 24% of global pre-term births. India stands first among 10 nations contributing

around 60% of premature deliveries⁽⁸⁾. In a study conducted by ahankari et al, the hospital inbirths were compiled from 1st January, 6% were pre-term deliveries, 13.8% were low birth weight deliveries. Multigravida women has a lower risk of low birth weight when compared with primigravida. Anemia was common in 91% of women tested. Elderly primi mothers have a higher incidence of low birth weight in rural Indian settings. Lei et al conducted study in china

in 2013. In that study 28045 live infants were included. 2845 PIH women were included. These PIH women are at a higher risk of attaining low birth weight when compared with antenatal mothers who don't have gestational hypertension⁽¹⁰⁾. In a study conducted by Chaitanya et al, 709 antenatal mothers with risk factor of dental infections and genitourinary infections were included. Rates of preterm birth and low birth weight in the study population were 7.6%, 11.4% respectively. Previous pre-term delivery, periodontitis, oligohydramnios, gestational diabetes mellitus and maternal short stature were risk factors for pre-term birth, while periodontitis, gestational hypertension and genital infection during the later stages of pregnancy were the independent risk factors for low birth weight. In another study antenatal women were given green leafy vegetables and fruit. Among 2291 antenatal mothers, 1360 neonates were included. In 1094 newborns whose mothers started supplementation > 90 days before pregnancy, birth weight was higher in the treatment group⁽¹¹⁾.

Conclusion

Period prevalence of low birth weight babies and prematurity is 34.71% and 15.58% respectively. Risk factors are not independent to each other with maternal and foetal risk factors have almost have an effect on nearly three fourths of low birth weight neonates.

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