

## Original Article

# FACTORS AFFECTING BIRTH WEIGHT: A STUDY IN A SECONDARY LEVEL HOSPITAL IN GAS AFFECTED AREA OF BHOPAL

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**Financial Support:** None declared

**Conflict of interest:** None declared

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**How to cite this article:**

Joshi SM, Likhar SK, Athavale AV, Shukla US. Factors Affecting Birth Weight: A Study in a Secondary Level Hospital in Gas Affected Area of Bhopal. Natl J Community Med 2013; 4(4): 570-3.

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**Date of Submission:** 19-09-13

**Date of Acceptance:** 18-11-13

**Date of Publication:** 31-12-13

## ABSTRACT

**Background:** Birth weight is an alarming indicator to judge the survival chances of the new-born. Many of the new-borns die during their first year of life because of low birth weight as they become the victims of protein energy malnutrition and infection.

**Objectives:** The study was conducted with an objective to measure the frequency of low birth weight (LBW) at a Secondary level hospital in Bhopal city and to find the determinants of low birth weight like maternal age, parity, gestational age, anaemia, sex of baby etc.

**Material & method:** As a retrospective analytical study, obstetric records of all women who delivered in the Indira Gandhi Mahila Evam Balya Chikitsalaya, Gas Rahat, Bhopal over a period of two months i.e. September and October 2012 were examined.

**Statistical analysis:** Data was analysed using SPSS version 20 statistical software. Chi square test was applied as a test of significance.

**Result:** Out of the 441 new-borns included in the study, 242 (54.9%) were males and 199 (45.1%) were females. Out of 441, 52 new-borns (11.8%) had birth weight of less than 2.5 kg. The period of gestation (POG) of mother was significantly associated with birth weight. Anaemia in mother, parity of mother, maternal age and Sex of the baby were not significantly associated with birth weight of the baby.

**Conclusion:** As far as Low birth weight is concerned frequency is not high in gas affected area as this hospital is specifically meant for Gas affected victims.

**Key words:** Birth weight, low birth weight, maternal age, Period of gestation, Anaemia.

## INTRODUCTION

Birth weight is an alarming indicator to judge the survival chances of the new-born. Many of the new-borns die during their first year of life because of low birth weight as they become the victims of protein energy malnutrition (PEM) and infection. The infant mortality rate is about 20 times higher for all low birth weight babies than other babies. The lower the birth weight, the lower is the survival chance of the new-born. By the international agreement, Low birth weight has been defined as "birth weight of less than 2,500 grams (2.5 kg)."<sup>1</sup> The birth weight of the infant is preferably measured within the first hour of its birth and before significant postnatal weight loss has occurred<sup>1</sup>.

The public health significance of low birth weight may be ascribed to numerous factors: its prevalence; its association with a high risk of perinatal mortality, morbidity, and its potential for generating a pool of young children with malnutrition and small adult stature; the very high cost of specialized management and intensive care units; and its association with socioeconomic underdevelopment<sup>2</sup>. As per NFHS-III<sup>3</sup> data the infant mortality rate is 49/1000 live birth for an average or large size baby, but it is 62/1000 live birth for a smaller than average baby and 129/1000 live birth for a very small baby. Similarly, the risk of mortality is particularly high for small babies during the neonatal period. When compared with an average size baby, the neonatal mortality rate is 30 percent higher for a smaller than average baby and 183 per-

cent higher for a very small baby<sup>3</sup>. Thus, prevention of low birth weight would help in the reduction of high neonatal & infant morbidity and mortality<sup>4</sup>.

This study was aimed to find out the frequency of low birth weight and various factors affecting it in a secondary level hospital catering to methyl iso-cynate gas affected area of Bhopal.

### OBJECTIVES

The objectives of the study were to measure the frequency of low birth weight (LBW) in a secondary level hospital of Bhopal city and to find the association of low birth weight with various factors like maternal age, parity, gestational age, anaemia, sex of baby etc.

### MATERIAL & METHOD

As a retrospective analytical study, obstetric records of all women who delivered in the Indira Gandhi Mahila Evem Balya Chikitsalaya, Gas Rahat, Bhopal over a period of two months i.e. September and October 2012 were examined. In the present study 441 subjects included were those having live births through normal, assisted, instrumental or Caesarean section deliveries. The weights of the new-borns were measured without clothes on a digital weighing scale soon after the birth. Birth weight of less than 2500gm is considered as low birth weight baby. The mother's age taken as per case sheet record. The criterion for pre term baby was below 37 weeks of gestation. Anaemia was reported on the basis of haemoglobin estimation during admission at the time of delivery. Data was analysed using SPSS version 20 statistical software. Chi square test was applied as a test of significance.

#### Definitions:

**Birth weight:** Weight of the newborn obtained immediately after birth and ideally it should be measured within the first hour of birth before significant postnatal weight loss occurs.

**Low Birth Weight:** Birth weight of a newborn baby who weighs 2.5 kg or less irrespective of gestational age.

**Term:** A baby born after the period of 37 completed weeks but less than 42 completed weeks.

### RESULT

The mean weight of the new-born in the present study was 2.72±0.41 kg. Out of the 441 new-borns included in the study, 242 (54.9%) were males and 199 (45.1%) were females. Out of 441, 52 new-borns (11.8%) have birth weight of less than 2.5 kg. Out of 52 low birth weight babies 33 (63.46%) were boys and 19 (36.53%) were girls showing higher proportion of LBW amongst male child, but the difference was not significant statistically (Table-1).

**Table 1: Association between Sex of Baby and Birth Weight**

Sex of Baby	Birth Weight		Total
	Normal (%)	Low (%)	
Female	180 (90.45)	19 (9.54)	199
Male	209 (86.36)	33 (13.63)	242
Total	389	52	441

X<sup>2</sup> = 1.755 and P value = 0.185; \*not significant

**Table-2: Association between Gestational Age and Birth Weight**

Gestational age	Birth Weight		Total
	Normal (%)	Low (%)	
Pre Term	35 (76.09)	11 (23.91)	46
Term	354 (89.62)	41 (10.37)	395
Total	389	52	441

X<sup>2</sup> = 7.255 and P value is 0.007; \*significant

# Pre-term: Babies born before the end of 37 weeks gestation

Period of gestation (POG) shown significant association with the birth weight as 23.91% of the babies born preterm (a POG of <37 weeks) had low birth weight as compared to only 10.37 % of LBW babies born at term with complete POG (Table-2).

**Table 3: Distribution of Maternal Age according to Birth Weight**

Birth Weight	Normal	Low
Babies	389	52
Mean Maternal age	24.945	24.0346
Std. Deviation	3.75665	3.02213
Std. Error Mean	0.19047	0.41909

t value = 1.67 and P value = 0.094\* not significant

The mean maternal age for normal birth weight babies is 24.94 with 3.75 SD while mean maternal age for low birth weight babies is 24.03 with 3.02 SD showing no significant association between maternal age and birth weight (Table-3). At the time of delivery 53.28 % of the women were anaemic but it was not significantly associated with birth weight of the baby (Table-4).

**Table 4: Association of Haemoglobin Levels of Mothers and Birth Weight**

Maternal Hb.	Birth Weight		Total
	Normal (%)	Low (%)	
High (>11%)	181(87.86)	25 (12.1)	206
Low (<=11%)	208 (88.51)	27 (11.48)	235
Total	389	52	441

X<sup>2</sup> = 0.044 and P value = 0.834; \*not significant

There was no significant association between parity of the mother and birth weight of the babies. Multiparous mother delivered 12.69% of the LBW babies as

compared to 10.49% of babies born to primipara (Table- 5).

**Table 5: Association between Parity and Birth Weight**

Parity	Birth Weight		Total
	Normal (%)	Low (%)	
Multi	227 (87.37)	33 (12.69)	260
Primi	162 (89.50)	19 (10.49)	181
Total	389	52	441

$\chi^2 = 0.494$ , P value = 0.482; \* not significant

## DISCUSSION

In the present study frequency of low birth weight is 11.8% which is low as compared to that observed in hospital based studies by Neeraj Agrawal<sup>4</sup> (2005) & P. S. Thomre<sup>5</sup> (2012) i.e. 26.5% & 18.1% respectively. In community based studies such as NFHS -3<sup>3</sup>, S.K. Jha (2009)<sup>6</sup>, Hirve<sup>7</sup> and Deshmukh et al (1998)<sup>8</sup> found very high prevalence of low birth weight babies i.e. 22%, 27.9%, 29% and 30.3%, respectively.

Anaemia in mother at the time of delivery was 53.8% and it was not significantly associated with birth weight of the baby. The findings are similar to those reported by Neeraj Agrawal<sup>4</sup> (2005), Pinheiro et al<sup>9</sup> (2001) and S.R. Srikrishna<sup>10</sup> (2003) but contradict with studies of S.K. Jha (2009) in rural area of Varanasi district<sup>5</sup>, J.S. Deshmukh (1998) in an urban area of Nagpur district<sup>8</sup> and P. S. Thomre<sup>5</sup> (2012) which have established a significant relationship between anaemia and low birth weight.

The period of gestation (POG) was significantly associated with birth weight. The findings are similar to those reported by S.R. Srikrishna<sup>10</sup> (2003). This relationship has been studied by many investigators and forms the basis of the curves used to create the WHO "universal" gestation specific growth charts.

Maternal age have no significant association with birth weight. Similar finding were observed in S.R. Srikrishna<sup>10</sup> study (2003). But this is in contrast to the findings of Mathai et al (1996) who found that maternal age was a significant factor affecting birth weight<sup>11</sup>.

This study shows no significant association between parity of the mother and birth weights of the babies. A similar finding was reported in the studies of Mathai et al (1996) and S.R. Srikrishna (2003). This is in contrast with the study of J.S. Deshmukh (1998) in an urban area of Nagpur district<sup>8</sup> and Boratne av (2012) in which low birth weight was more common in first order babies by almost 50% when compared to babies whose birth order was 2 or more<sup>12</sup>.

No significant association was found in the present study between birth weight and sex of baby. This is in contrast to the study of Boratne av (2012) in which the prevalence of low birth weight was more among females than in male babies<sup>12</sup>.

## Limitations

Factors like type of food (veg V/s non-veg), location of residence (rural V/s urban), smoking or exposure to second hand smoke, Stress and lack of support and low quality & frequency of ante-natal care may also contribute to low birth weight occurrence. As it is a hospital based study from single hospital, not all sections of the community were covered; so community based studies encompassing above factors can be carried out. Maternal nutrition plays a crucial role in the development of the foetus and in this study we could not obtain precise information regarding pre pregnant weight of the women and other anthropometric measurement.

## CONCLUSION

This study was done to determine frequency of low birth weight which was found to be 11.8% in this study. Out of the factors studied significant relationship was found between Period of gestation and birth weight. Others factors such as maternal anaemia, maternal age, parity and sex of the baby were not significantly associated with low birth weight. Frequency of birth of low birth weight babies was low in the study subjects (as compared to the national figures) in this gas affected area as this hospital is specifically meant for gas affected victims of Bhopal.

Large multicentric studies can be carried out to find association of low birth weight with literacy, birth spacing, smoking and detailed dietary intake during pregnancy.

## Acknowledgement

We thank Dr. R.K. Tiwari, Superintendent Indira Gandhi Mahila Evem Balya Chikitsalaya, Gas Rahat, Bhopal for providing data. We also thank Dr. M.K. Joshi, Ex- Director Medical Services M.P. for his encouragement and assistance throughout the conduct of the study.

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