Original Research Article

DOI: https://dx.doi.org/10.18203/2349-3291.ijcp20212466

Prevalence and risk factors associated with low birth weight babies-a cross sectional study

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Received: 10 June 2021 Accepted: 21 June 2021

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ABSTRACT

Background: Babies with a birth weight of less than 2500 grams, irrespective of the period of their gestation are termed as low birth weight (LBW) babies. Despite consistent efforts to improve the quality of maternal and child health, more than twenty million LBW babies are born every year throughout the world. The present study was to explore the effects of various maternal risk factors associated with low birth-weight of institutionally delivered newborns. Across the world, neonatal mortality is 20 times more likely for LBW babies compared to normal birth weight (NBW) babies (>2.5 kg).

Methods: A cross sectional study was conducted in neonatal intensive care unit (NICU) of ACS Medical College and Hospital, Chennai from December 2019 to October 2020. Altogether 350 babies were taken who were delivered at ACS hospital.

Results: The number of times of ANC attendance was also significantly associated with LBW, odds ratio (OR)=1.296, and p=0.001. The number of meals was not associated with LBW OR=0.946, and p=0.831. The gestational age assessed as completed weeks of pregnancy was significantly associated with LBW OR=3.302; p=0.00001.

Conclusions: This study suggests that there are several factors interplaying which lead to LBW babies. Sociodemographic factors (maternal age and gestational age) and antenatal care are more important.

Keywords: Low birth weight, Maternal and child health services, Maternal risk factors, Newborn

INTRODUCTION

Low birth-weight (LBW) is a weight at birth less than 2,500 grams irrespective of gestational age. More than 20 million infants worldwide, representing 15.5 percent of all births are born with LBW, 95.6 percent of them in developing countries. Half of all LBW babies are born in South-central Asia, where more than a quarter (27 per cent) of all infants weighs less than 2,500 gram at birth. ²

This is based on epidemiological observations that infants weighing less than 2,500 grams are approximately 20 times more likely to die than heavier (normal babies). A child's birth weight is an important indicator of a child's vulnerability to the risk of childhood illness and the chances of survival.

LBW has been associated with higher probabilities of infection, malnutrition and handicapped conditions during childhood, mental deficiencies and problems related to behaviour and learning during childhood.^{3,4}

Children who survive LBW have a higher incidence of diseases, retardation in cognitive development and undernourishment. There is also evidence that LBW or its determinant factors are associated with a predisposition to higher rates of diabetes, cardiac diseases and other future chronic health problems. ^{5,6}

The present study was to explore the effects of various maternal risk factors associated with LBW of institutionally delivered newborns.

METHODS

A hospital based unmatched case control study was carried out at ACS medical college and hospital. After admission, the majority of births take place within 2 days. The hospital stay is usually at least 1 day after delivery unless the mother or infant experiences problems or the mode of delivery was surgical. The study data were collected between December 2019 and October 2020 by using interview technique.

Inclusion and exclusion criteria

Mothers along with single live newborn delivered at ACS hospital were included in the study. Mothers who had delivered still birth baby and mothers refusing to give consent were excluded from the study. Eligible mothers were interviewed face to face within 24 hours after delivery. Abstraction of ANC cards and medical records of mothers were also made and anthropometric measurements were taken after interview.

Cases

Mothers delivering live born singleton term baby with birth weight less than 2500 gm were taken as cases, while mothers delivering live born singleton term baby with birth weight 2500 gm or more were also taken.

Sample size

Sample size was estimated using software Epi Info 7.0 version and cross-checked using software nMaster 2.0 version. The sample size estimation was done taking 80% power, 5% alpha error, and 2 as anticipated odds ratio. 350 mothers were included in the study.

Questionnaire was translated into local language and pretested before data collection. Mothers were interviewed by researchers only.

Variables

The questionnaire contained the variables on maternal factors (age, weight, height, parity, ANC check-up, iron (60 mg daily) and calcium (500 mg) supplementation, and interpregnancy interval), and sex of baby), and diseases during pregnancy (anaemia, night blindness, hypertension, heart diseases, tuberculosis, and eclampsia).

Statistical analyses

The filled questionnaires were checked and rechecked for their completeness at the end of the day during data collection. They were coded before the data entry. Data were entered into the Microsoft Excel 2007 version and were analyzed using predictive analytics software (PASW) statistical software 18.0. Independent associations between variables were characterized by adjusted odds ratios and 95% confidence intervals.

RESULTS

A total of 90/350 babies weighed below 2.5 kg, giving a prevalence of 25.5%. 266/357 (74.5%) of babies weighed between 2.5-5.0 kg (Table 1). The overall mean birth weight was 2.9 (range 1.0-5.0 kg). Among low birth weight babies (<2.5 kg), the mean was 2.1 (range 1-2.4 kg). Among babies with birth weight 2.5–5.0 kg, the mean birth weight was 3.1 (range 2.5-5.0). The mean age of mothers was 18 (range 13-19) with majority of mothers aged 21-28 years. Majority of the mothers (99%) attended antenatal care. However, only (42%) completed the recommended 4 visits in focused antenatal. Majority (67.2%) of mothers, reported to have eaten at least 3 meals during the pregnancy and most reported they fed on a balanced diet. 1.7% were multiple pregnancies. They were slightly more female than male babies, (51.3%) and (48.7%).

Table 1: Socio-demographic characteristics of mother.

Characteristics	N=350			
Age				
Mean	17			
Median	2			
Age groups (years)				
<20	4 (1.4)			
21-28	353 (98.6)			

The gestational age assessed as completed weeks of pregnancy was significantly associated with LBW (OR=3.302; p=0.00001). The sex of the baby (OR=0.979; p=0.932), birth order (OR=1.322; p=0.360) and congenital anomalies (OR=0.813; p=0.704) were not associated with LBW. 1.7% were multiple pregnancies. They were slightly more female than male babies, (51.3%) and (48.7%) respectively as shown in the Table 2.

Table 2: Characteristics of children.

Characteristics	N=350	Crude OR (95% CI)	P value
Weight (kg)			
<2.5	90		
2.5-4	260		
Sex of the baby			
Male	169	0.979 (0.608, 1.577)	0.932
Female	181		

Continued.

Characteristics	N=350	Crude OR (95% CI)	P value
Birth order			
First	270	1.322 (0.727, 2.408)	0.360
Second and more	80		
Completed weeks			
<37	50	3.032 (1.682, 5.466)	0.001
37-40	300		
Congenital anomalies			
Absent	340	0.813 (0.278, 2.373)	0.704
Present	10		

Table 3: Effect of maternal socio economic factors on the birth weight of new born.

Characteristic	LBW (n)	Normal	Crude OR (95% CI)	P value
Age of mother (years)				
<20	3	4	4.4 (0.740, 26.37)	0.102
21-28	87	256		
Frequency of ANC visits				
<4	55	152	1.296 (0.695, 1.474)	0.001
>4	34	109		
Pregnancy				
Singleton	78	260	0.165 (0.030, 0.915)	0.039
Multiple	5	7		
No of meals				
<3	27	80	0.946 (0.568, 1.575)	0.831
≥3	66	177		

Multiple pregnancy was significantly associated with LBW OR=0.165, and p=0.039. Age of the mother was not associated with LBW, OR=4.5, and p=0.102. Marital status was not associated with LBW, OR=0.666, and p=0.100. ANC attendance was not associated with LBW, OR=2.966, and p=0.280. The number of times of ANC attendance was also significantly associated with LBW, OR=1.296, and p=0.001. The number of meals was not associated with LBW OR=0.946, and p=0.831.

DISCUSSION

Our study set out to establish the prevalence and risk factors for LBW among mothers who delivered in a tertiary health institution. We found a LBW prevalence rate of 25.5%, which is much higher than the prevalence rate of 13.5%. Two other studies by Gogoi in Assam, India and Kumar et al in West Bengal, India showed almost similar proportion of LBW.^{7,8} Compared to our study that abstracted birth weight from written records, the birth weight reported by the 2011 UDHS was obtained from multiple sources including written records, and subjective mother's estimate of birth weight for babies who were delivered outside the health unit. The LBW prevalence rate in our study is also much higher than average estimate of 16.5% rate and the region. 9,10 Previous studies conducted also found much lower LBW prevalence rates than in our study.11 The observed differences could be a reflection of probable variations in study populations and seasons when these studies were conducted.12

Pre-term delivery and multiple pregnancies were significantly associated with LBW consistent with other studies. 13,14 Pregnancy was not associated with LBW unlike findings reported by other studies. 15

Sex of the baby was not associated with LBW in our study. In a cross-sectional study conducted among 540 mothers at Gondar University Hospital in Northern Ethiopia, being female was associated with LBW.¹⁶ Birth order was not associated with LBW in our study. First births are more likely to result in LBW and the likelihood of birth weight decreases as birth order increases.

LBW is a public health problem linked to a wide range of possible predictors, sometimes those are difficult to handle. Despite efforts to decrease the proportion of newborns with LBW, success has been quite limited and the problem persists in both developing and developed countries.

Limitations

The prevalence rate of LBW we found in this study was only over a period of 1 year. The cross-sectional study design does not show seasonal variations of LBW. This study does not also consider potential risk factors including HIV infection, placental factors and intra-uterine infections. In our study only the important maternal factors of low birth weight is been highlighted. Also only a small sample size have been studied.

CONCLUSION

Study findings suggest that selectively targeted interventions such as delay age at first pregnancy, improving maternal education and nutrition, and iron and calcium supplementation can prevent LBW. It is suggested to conduct more comprehensive studies to assess maternal blood groups and different diseases during pregnancy as associated factors for low birth weight babies.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

Institutional Ethics Committee

REFERENCES

- World Health Organization. Low birth weight: a tabulation of available information, WHO/MCH/92.2. Geneva: World Health Organization. 1992. Available at: https://apps.who.int/iris/handle/10665/59205. Accessed on 25 January 2021.
- 2. WHO and UNICEF. Country, regional and global estimates of low birth-weight. 2004. Available at: https://apps.who.int/iris/handle/10665/43184. Accessed on 25 January 2021.
- 3. Berkowitz GS, Papiemik E. Epidemiology of preterm birth. Epidemiol Rev. 1993;15:41443.
- Dunin-Wasowicz D, Rowecka-Trzebicka K, Milewska- Bobula B, Kassur-Siemienska B, Bauer A, Idzik M, et al. Risk factors for cerebral palsy in very low birth weight infants in the 1980s and 1990s. J Child Neurol. 2000;15:414-20.
- 5. Barker DJP, Forsen T, Uutela A, Osmond C, Eriksson JG. Size at birth and resilience to effects of poor living conditions in adult life: longitudinal study. Br Med J. 2001;323:1273-6.
- 6. Eriksson JG, Forsen T, Tuomilehto J, Winter PD, Osmond C, Barker DJP. Catch up growth in childhood and death from coronary heart disease: longitudinal study. Br Med J. 1999;318:427-31.
- 7. Gogoi N. Socio-demographic determinants of low birth weight in Northeastern city, India. Int J Intg Med Sci. 2018;5(3):587-91.

- 8. Kumar S, Kumar R, Tewari A. Prevalence and Determinants of Low Birth Weight: An Experience from a Secondary Referral Unit Of Burdwan District, West Bengal (India). IOSR J Dent Med Sci. 2018;17(3):5459.
- 9. World Health Organization, International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, World Health Organization, Geneva, Switzerland. 1992. Available at: https://apps.who.int/iris/handle/10665/42980. Accessed on 25 January 2021.
- 10. Mavalankar DV, Gray RH, Trivedi CR. Risk factors for preterm and term low birthweight in Ahmedabad, India. Int J Epidemiol. 1992;21(2):263-72.
- 11. Ehrenberg HM, Dierker L, Milluzzi C, Mercer BM. Low maternal weight, failure to thrive in pregnancy, and adverse pregnancy outcomes. Am J Obstet Gynecol. 2003;189(6):1726-30.
- 12. Singh SD, Shrestha S, Marahatta SB. Incidence and risk factors of low birth weight babies born in Dhulikhel Hospital. J Inst Med. 2003;32(3):339-42.
- 13. Ugwu R. The Proportion of Low Birth Weight Babies due to Small for Gestational Age and Prematurity in Port Harcourt, South Nigeria-Changing Trends. Int J Pediatr Neonat. 2010;13(1).
- Adamson H. Low Birth Weight in Relation to Maternal Age and Multiple Pregnancies at Muhimbili National Hospital. DMSJ. 2006;14(2).
- 15. Dennis N, Aribodor OCN, Christine IE, Ikechukwu O, Reed PW, Harrison OE. Association of Low Birth Weight and Placental Malarial Infection in Nigeria. J Infect Dev Ctries. 2009;3(8):620-3.
- Zenebe K, Birhan N. Low Birth Weight & Associated Factors Among Newborns in Gondar Town, North West Ethiopia:Institutional Based Cross-Sectional Study. Indo Global J Pharm Sci. 2014;4(2):74-80.

Cite this article as: Gopal G. Prevalence and risk factors associated with low birth weight babies-a cross sectional study. Int J Contemp Pediatr 2021;8:1168-71.