

Maternal Factors Involved with Low Birth Weight (LBW) Newborns

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ABSTRACT

Objective: To find out the maternal factors involved with low birth weight (LBW) newborns.

Study Design: Cross sectional study.

Place and Duration of Study: This was a Multi-centric study conducted at three centers i.e. Department of Pediatrics Medicine, Bahawal Victoria Hospital Bahawalpur, Department of Pediatrics, Ghulam Muhammad Mahar Medical College Hospital, Sukkur, and Department of Pediatrics, Unit-II, Children Hospital Chandka Medical College / SMBBMU, Larkana from December 2018 to May 2019.

Materials and Methods: A total of 335 single alive LBW babies delivered, referred, or reported at study centers, were included. All mothers of newborns were aged 18 to 35 years. Newborn's data including gender and weight were recorded. Maternal data included age, gestational age, parity status, details of antenatal visits and any sort of complications. Mother's data such as pregnancy induced hypertension (PIH) (BP systolic more than 140mm of Hg and diastolic more than 90mm of Hg), anemia (hemoglobin less than 10mg/dl) during pregnancy or antepartum hemorrhage (APH) were also noted.

Results: There were 170 (50.7%) male and 175 (49.3%) female newborns. IUGR was reported in 193 (57.6%) newborns while there were 142 (42.4%) preterm newborns Mean weight of the newborns was recorded as 2238 grams with a standard deviation of 327 grams. Majority of the newborns, 276 (82.4%) had birth weight between 2000 to 2500 grams, belonged to rural areas 197 (58.8%). Majority of the mothers, 261 (77.9%) were aged 20 to 29 years, 178 (53.1%) had regular antenatal visits (≥ 3 visits), 198 (59.1%) were multipara and 170 (50.7%) had anemia during pregnancy.

Conclusion: High frequency of maternal factors such as multiparity, anemia, low to medium socioeconomic status, rural area of residence, irregular medical check-ups and age from 20 to 30 years, were noted amongst mothers of LBW newborns.

Key Words: low birth weight, maternal factors, anemia, rural area.

Citation of articles: Haqm HMA, Bharo MA, Khuhro AA. Maternal Factors Involved with Low Birth Weight (LBW) Newborns. Med Forum 2019;30(6):103-106.

INTRODUCTION

Babies born with a weight less than 2500 grams are known as LBW. LBW is described to be one of the most important reasons for morbidity and mortality amongst newborns.¹

South Asia is the biggest contributor to prevalence of LBW newborns globally.² According to an estimate, 72% newborns are from Asia.³

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Received: May, 2019

Accepted: May, 2019

Printed: June, 2019

Major differences are found in different parts of the world regarding prevalence of LBW while there exists a variation even within same countries comparing urban and rural or socio-economic variations amongst different populations.⁴⁻⁶

Not much cumulative data about the prevalence of LBW in Pakistan exists, but studies done in different settings show a prevalence of 19 to 30%.⁷⁻⁹ Treatment of LBW babies is linked with high cost and puts pressure on baby care facilities. In terms of burden of LBW, the problem cannot be ignored specially in developing countries due to its importance in public health related problems.¹⁰⁻¹²

LBW is usually a result of preterm delivery (gestation of less than 37 weeks) or intra-uterine growth retardation (IUGR) or both.¹³ Newborns as preterm (less than 37 weeks) have high comparatively high rates of worse outcomes and are more susceptible to problems like infection that may need longer duration of hospitalizations and contribute to high cost to families as well as government/ hospitals/ administrations.^{1,14} Multiple factors like genetic, placental, fetal and maternal factors, and their interactions are involved in the etiology of LBW.¹⁵ Birth weight is known to be affected from factors like

fetal growth that is connected largely to nutritional aspects of the mother. Low socio-economic settings significantly increase the chances of deliveries resulting in LBW. Data shows that maternal factors such as nutritional status of the mother, anemia, age, parity status and antenatal visits, are known to affect birth weight of the babies.^{16,17} UNICEF documented that majority of LBW babies are delivered at informal settings where their weight is not measured routinely and this makes it mighty difficult to exactly estimate the scale of this problem.¹⁸ We planned this multi-central study to find out the maternal risk factors involved with LBW.

MATERIALS AND METHODS

This multi-centric, cross sectional study was conducted at 3 centers, from 15th December 2018 to 15th May 2019. The venue for this study were Department of Pediatrics Medicine, Bahawal Victoria Hospital Bahawalpur, Department of Pediatrics, Ghulam Muhammad Mahar Medical College Hospital, Sukkur, and Department of Pediatrics, Unit-II, Children Hospital Chandka Medical College / SMBBMU, Larkana.

Approval from ethical and research committees of the relevant institutes involved in the study were acquired. Verbal consent was taken from parents or guardians of all the study participants explaining them the aims and objectives of this study while secrecy of the data was ensured.

A total of 335 single alive LBW babies delivered or referred, and reported within 6 hours after delivery, during the study period were included. All mothers of newborns were aged 18 to 35 years. We excluded mothers who were less than 18 years of age, or mothers who reported > 5 deliveries (grand multi-para), mothers currently delivering twin babies, or delivering babies who had congenital malformations, chromosomal or any kind of genetic disorders. Similarly newborns of all these mothers as per exclusion criteria mentioned were also excluded from the study.

Gender and weight of the newborn were recorded. Maternal data included age, gestational age, parity status, details of antenatal visits and any sort of complications. Mother's data such as pregnancy induced hypertension (PIH) as BP systolic more than 140mm of Hg and diastolic more than 90mm of Hg, anemia (hemoglobin less than 10 g/dl) during pregnancy or antepartum hemorrhage were noted. Mother's medical record and charts were analyzed for recording maternal data.

SPSS version 21.0 was used for data handling and analysis. Frequency and percentages were calculated for qualitative variables while quantitative variables were presented as mean and standard deviation.

RESULTS

Out of a total of 335 newborns, there were 170(49.3%) male and 175 (50.7%) female. IUGR was reported in 193 (57.6%) newborns while there were 142 (42.4%) preterm newborns, out of which, 112 (78.9%) were small for gestational age (SGA) and 30 (21.1%) appropriate for gestational age (AGA). Mean weight of the newborns was recorded as 2238 grams with a standard deviation of 327 grams. Majority of the newborns, 276 (82.4%) had birth weight between 2000 to 2500 grams, 50 (14.9%) between 1500 to 1999 grams while remaining 9 (2.7%) had weight less than 1500 grams. There were 138 (41.2%) newborns who belonged to urban areas while 197 (58.8%) from rural areas. Socioeconomic status was noted as low (income less than Rs.20000 per month) in the families of 147 (43.9%), medium (> Rs. 20000 but less than Rs.35000 per month) in 124 (37.0%) and high (> Rs.35000 per month) status in 64 (19.1%).

Table No.1: Characteristics of LBW newborns

Characteristics of Newborns		Number (%)
Gender	Male	170 (49.3%)
	Female	175 (50.7%)
IUGR		193 (57.6%)
Preterm	SGA	112 (33.4%)
	AGA	30 (9.0%)
Birth Weight	< 1500 grams	9 (2.7%)
	1500 to 1999 grams	50 (14.9%)
	2000 to 2500 grams	276 (82.4%)

Table No.2: Maternal Characteristics of LBW Newborns

Characteristics of Newborns		Number (%)
Age	<20 years	112 (33.4%)
	20 to 29 years	30 (9.0%)
	30 to 35 years	9 (2.7%)
Parity	Primipara	137 (40.9%)
	Multipara	198 (59.1%)
Antenatal Visits	Regular	178 (53.1%)
	Irregular	157 (46.9%)
Area of Residence	Rural	197 (58.8%)
	Urban	138 (41.2%)
Socioeconomic status	Low	147 (43.9%)
	Medium	124 (37.0%)
	High	64 (19.1%)
Anemia		170 (50.7%)
PIH		61 (18.2%)
APH		53 (15.8%)

Majority of the mothers, 261 (77.9%) were aged 20 to 29 years, 50 (14.9%) between 30 to 35 years whereas 24 (7.2%) were less than 20 years of age. Most of the Maternal records revealed that 178 (53.1%) mothers had regular antenatal visits (≥ 3 visits) while 157 (46.9%) had irregular antenatal visits. It was noted that 137 (40.9%) mothers were primipara while remaining

198 (59.1%) were multipara. History of anemia during pregnancy was noted in 170 (50.7%), PIH reported in 61 (18.2%) and APH in 53 (15.8%).

DISCUSSION

Worldwide, incidence of LBW is rising despite having done interventions with an aim to address this issue. Globally, UNICEF recorded 22 million deaths amongst LBW infants in 2013 while they also noted that most of those died during the neonatal period.¹⁸ It is also an established fact that most of the LBW newborns hail from lower to middle income countries.³ Pakistan, being a developing country need studies which are aimed to analyze factors contributing to LBW and this multi-central study was done with the aim to note the maternal factors involved in LBW newborns.

In the current study, we noted low socioeconomic status in the families of 147 (43.9%) newborns, medium in 124 (37.0%) and high in 64 (19.1%). It is well known fact that majority of our population belong to middle or lower to middle class so this fact pronounced in our findings as 80.9% of the LBW newborns belonged to lower and middle socioeconomic status. As this study was conducted at government teaching hospitals where medical care is usually free, so most of the lower and middle class families are always reaching these healthcare facilities.

We noted that most of the mothers, 261 (77.9%) were aged 20 to 29 years, 50 (14.9%) between 30 to 35 years whereas 24 (7.2%) were less than 20 years of age. Our findings are very consistent to what was found in another local study from Karachi¹⁹ where 70% of the mothers of LBW newborns belonged to the age group 20 to 29 years. Although the mother's age group as 20 to 29 years does not raise the chances of LBW in newborns as has been found by multiple studies,^{15,20} but this age group of mothers seems most common amongst LBW babies. In terms of less number of mothers having less than 20 years of age, our results are comparable to a study conducted in India²¹ where the researchers noted that only 6.9% mothers had age less than 20 years. This was very similar to what we noted as 7.2%. Yilgran CS and colleagues²² also noted that only 3.4% mothers had age less than 20 years. In Pakistan, most of the marriages are conducted when the girls are in their 20s so the age group of 20 to 29 years is found commonly in various studies analysis newborns.

In terms of parity, 137 (40.9%) mothers were primipara while remaining 198 (59.1%) were multipara in this study. Our results are quite consistent with those of Shams S¹⁹ who also found that 55.6% LBW newborn belonged to multipara mothers. Results found by Mondal B²³ from India also depicted similar findings where it was found that parity is a significant factor for LBW.

We found that 50.7% mothers were having anemia during pregnancy. Anemia has been found a strong

factor in the mothers of LBW newborns.^{19,24} Malnutrition and anemia is quite common in developing countries like Pakistan, and has been found to influence weight of the newborns. It is also observed that growth of the fetus is adversely affected with inadequate maternal nutrition.²⁵

We also noted that 46.9% mothers had irregular antenatal visits. Less antenatal check-ups have been associated with LBW newborns by multiple researchers^{19,26} and we also noted high number of mothers (46.9%) having irregular antenatal visits.

In terms of limitations to this study, we did not have the data about all newborns reported at our centers as that would have given us an idea about the prevalence of LBW in our settings. We also did not have any controls or normal weight babies to compare with LBW newborns of the current study which would have been highly helpful in indicating the exact factors and their content to LBW.

CONCLUSION

Maternal factors such as multiparity, anemia, low to medium socioeconomic status, rural area of residence, irregular medical check-ups and age from 20 to 30 years, were noted in high proportions amongst mothers of LBW newborns. Improvement is required for better antenatal care along with nutritional support.

Author's Contribution:

Concept & Design of Study:	Hafiz Muhammad Anwar ul Haq
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Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. WHO. Preterm babies: Fact sheet 363; [updated 2016; cited 2016 June 20]. Available from: <http://www.who.int/mediacentre/factsheets/fs363/en/>.
2. Sachdev HPS. Low birth weight in South Asia. *Int J Diab Dev Countries* 2001;21:13-33.
3. Vahdaninia M, Tavafian SS, Montazeri A. Correlates of low birth weight in term pregnancies: a retrospective study from Iran. *BMC Pregnancy Childbirth* 2008;8:12.
4. Sicuri E, Bardaji A, Sigauque B, Maixenchs M, Nhacolo A, Nhalungo D, et al. Costs associated with low birth weight in a rural area of Southern Mozambique. *Plos One* 2011;6(12):28744.

5. Blumenshine P, Egerter S, Barclay CJ, Cubbin C, Braveman PA. Socioeconomic disparities in adverse birth outcomes. *Am J Prev Med* 2010; 39(3):263–72.
6. Gebremedhin M, Ambaw F, Admassu E, Berhane H. Maternal associated factors of low birth weight: A hospital based cross-sectional mixed study in tigray, Northern Ethiopia. *BMC Pregnancy and Childbirth* 2015; 15(1):222.
7. Al Tal YS, Bataineh HA. Low Birth Weight: Risk factors in Irbid, Jordan. *Rawal Med J* 2006;31(2): 61-63.
8. Haneef S.M, Maqbool S, Arif M.A. Textbook of Paediatrics. 5th ed. Lahore: Pakistan Paediatric Association; 2007-2008.p.221–26.
9. Malik AN, Vaqar A, Razzaq A. Birth Weight pattern of newborns in hospital setup. *Pak Armed Forces Med J* 2008; 58(1): 36-40.
10. Taylor HG, Minich NM, Klein N, Hack M, Longitudinal outcomes of very low birth weight: Neuropsychological findings. *J Int. Neuropsych Soc* 2004; 113: 742-163.
11. Hack M, Klein NK, Taylor HG, Long-term developmental outcomes of low birth infants. *Future Child* 1995; 5: 176-96.
12. Peacock JL, Bland JM, Anderson HR. Preterm delivery: Effects of socioeconomic factors, psychological stress, smoking, alcohol, and caffeine. *BMJ* 1995; 311: 531-5.
13. Villar J, Bellizan J. The relative contribution of prematurity and fetal growth retardation-low birth weight in developing and developed societies. *Am J Obst Gyn* 1982;143:793.
14. Tshotetsi L, Dzikiti L, Hajison P, Feresu S. Maternal factors contributing to low birth weight deliveries in Tshwane District, South Africa. *PLoS One* 2019;14(3):e0213058.
15. Dhall K, Bagga R. Maternal determinants of birth weight of north Indian babies. *Ind J Pediatr* 1995; 62(3): 333–44.
16. Department of Health and Human Services [Internet]. Neonatal ehandbook: Small for gestation age; [updated 2014 July 16; cited 2016 January 18]. Available from:<http://www.health.vic.gov.au/neonatalhandbook/conditions/small-for-gestational-age-infants.htm>.
17. Feresu SA, Harlow SD, Woelk GB. Risk factors for low birthweight in Zimbabwean women: A secondary data analysis. *PLoS One* 2015 26; 10(6):e0129705.
18. UNICEF [Internet]. Low birth weight: Current status + process [updated 2015, cited 2016 January 08]. Available from: <http://www.data.unicef.org/nutrition/low-birthweight.html>.
19. Shams S. Low Birth Weight: Frequency and Association of Maternal Factors. *Pak Peads J* 2012;36(4):192-8.
20. Gattani PL, Nimale NE. Low birth weight and maternal risk factors: A case control study in a Government Medical College Hospital, Aurangabad (Maharashtra). *Ind J Comm Health* 1998;4:30–41.
21. Kapilashrami MC, Virk RS, Ganguly SS, Chatterjee K. Maternal risk factors as Determinants of Low Birth Weight among Armed Forces Families. *MJAFI* 2000; 56(2): 113–16.
22. Yilgwan CS, Abok II, Yinnang WD, Vajime BA. Prevalence and risk factors of low birth weight in Jos. *Jos J Med* 2009;4(1).
23. Mondal B. Low birth weight in relation to sex of baby, maternal age and parity: A hospital based study on Tangsa tribe from Arunachal Pradesh. *J India Med Assoc* 1998; 96: 362–64.
24. Hirve SS, Ganatra BR. Determinants of LBW: a community based prospective cohort study. *Indian Paediatr* 1994; 31(10):1221–5.
25. Awoleke JO. Maternal risk factors for low birth weight babies in Lagos, Nigeria. *Archives Gynaecol Obstet* 2012;285(1):1-6.
26. Joshi HS, Subba SH, Dabral SB. Risk factors associated with low birth weight in newborns. *Ind J Comm Med* 2005;30(4):142–44.