Original Article

Correlation of Birth Weight with Various Demographic Parameters

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ABSTRACT
Introduction: Birth weight in particular is strongly associated with foetal, neonatal and post-neonatal mortality and with infant and child morbidity. LBW babies who survive the critical neonatal period may suffer impaired physical and mental growth. The determinants of foetal growth have been the subject of considerable research and these differ considerably from the aetiological determinants of gestational duration. **Methods:** One hundred fifty newborns examined within 48 hours of their birth in the Department of Obstetrics and Gynecology/ Pediatrics at Guru Gobind Singh Medical College and Hospital, Faridkot. They were weighed naked on electronic weighing scale to the nearest of 5 grams. Gestational age was calculated as total duration of pregnancy in weeks from first date of the last normal menstrual period (LMP) to the time of delivery. **Results:** risk of low birth weight decreases with increasing age of mother but further increases after the age of 30 years. As the gestational age of mother increases the risk of low birth weight of newborns decreases, but after 39 completed weeks there is slight increase in risk of low birth weight. **Conclusion:** Advancing maternal age is associated with a decreased potential for fetal growth, possibly reflecting biological aging of maternal tissues and systems or the cumulative effects of disease. Results of multivariate analysis showed a U-shaped relationship between maternal age and LBW
Keywords: Low birth weight, Gestational age, Socioeconomic status

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INTRODUCTION

Birth weight in particular is strongly associated with foetal, neonatal and post-neonatal mortality and with infant and child morbidity. [1] It is the most important determinant of children's chance of survival, healthy growth and development in future. [2]

Globally, about one-sixth of all newborns are low birth weight (LBW, <2500 grams), which is single most important underlying risk factor for neonatal deaths. [3, 4] Only about half of the newborns are weighed at birth and for a smaller proportion of them gestational age is known. [5] According to a study an estimated 18 million babies are born with LBW. [6] They account for 60% to 80% of neonatal deaths.

LBW babies who survive the critical neonatal period may suffer impaired physical and mental growth. [7] Size at birth reflects two factors: duration of gestation and rate of foetal growth. So, it must be considered with respect to gestational age, otherwise the increase in size that occurs with age will lead to severe confounding of growth and maturity. Growth is defined as an increase in size over time and documentation of increasing size thus requires serial measurements. Moreover ultrasound measurements are not truly anthropometric. [8]

The determinants of foetal growth have been the subject of considerable research and these differ considerably from the aetiological determinants of gestational duration. [9]

The diagnosis of Large Gestational Age can also be important for the individual infants. LBW in full term infants (meaning IUGR), Maternal under nutrition and consequent IUGR could program body structure, physiology and metabolism in a manner that increases the individual's susceptibility to degenerative cardiovascular disease in later life. [10]

MATERIAL AND METHODS

The study was conducted in the Department of Obstetrics and Gynecology/ Pediatrics at Guru Gobind Singh Medical College and Hospital, Faridkot. One hundred fifty newborns were examined within 48 hours of their birth in this hospital. Gestational age was calculated as total duration of pregnancy in weeks from first date of the last normal menstrual period (LMP) to the time of

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delivery. Babies were weighed naked on electronic weighing scale to the nearest 5 gm. Kuppuswami's socioeconomic status scale was used to find out the socioeconomic status.

The present study was carried out in one hundred fifty newborns in the Department of Obstetrics and Gynecology/ Pediatrics at Guru Gobind Singh Medical College, Faridkot and following observations were recorded.

OBSERVATIONS AND RESULTS

Relationship between birth weight and age of mother
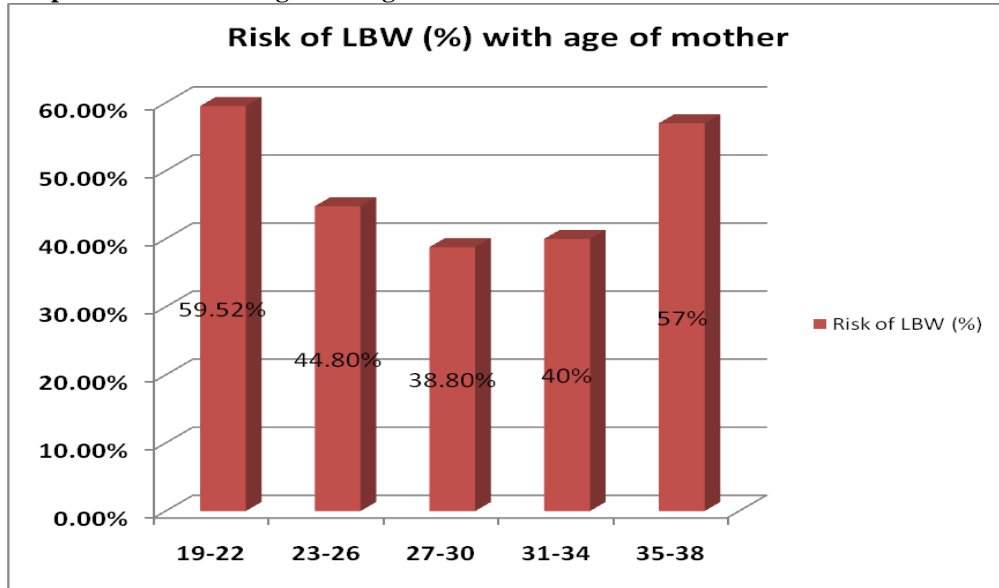
LBW=Low birth weight

Fig 1 reveals that the risk of low birth weight was highest in the maternal age group of 19-22 (59.5%). It decreased with increasing age of mother but once again increased after the age of 30 years. The risk of low birth was 57.0% in the maternal age group of 35-38 years.

Fig-2 Relationship between birth weight and socioeconomic status of parents
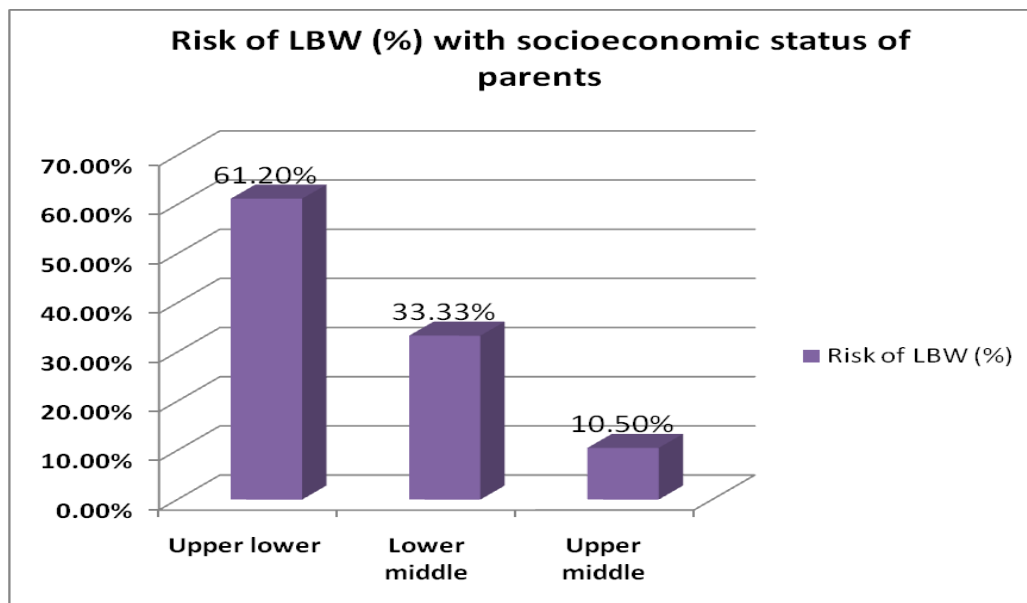
LBW=Low birth weight

Fig-2 shows that as the socioeconomic status of parents improves the risk of low birth weight of newborns decreases. Maximum risk of low birth weight (61.2%) was in upper lower class.

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Table-1 Relationship between birth weight and education of parents

Education of parents	No. of newborns with wt <2500gm	No. of newborns with wt ≥2500gm	Total (n)	Risk of LBW (%)
Illiterate	18	8	26	69.2%
Primary School	18	11	29	62.0%
Middle School	31	28	59	52.5%
High School	6	21	27	22.2%
Intermediate/Diploma	0	1	1	0%
B.A. or B.Sc.	0	6	6	0%
Professional degree/Hons./B.A. above	0	2	2	0%
Total	73	77	150	

LBW=Low birth weight

Table 1 shows that as literacy of parents increases the risk of low birth weight decreases. The risk of low birth weight in illiterate parents is 69.2%.

Table-2 Relationship between birth weight and occupation of parents

Occupation of parents	No. of newborns with wt <2500gm	No. of newborns with wt ≥2500gm	Total	Risk of LBW (%)
Unskilled worker	49	29	78	62.8%
Semiskilled worker	7	4	11	63.6%
Skilled worker	12	29	41	29.3%
Clercal/Shop/Farm	5	12	17	29.4%
Semi professional	0	2	2	0%
Professional	0	1	1	0%
Total	73	77	150	-

LBW=Low birth weight

Table 2 reveals that as the work of the parents shifted from unskilled to skilled worker the risk of low birth weight decreased. Risk of low birth weight was lowest in professionals.

Table-3 Relationship between birth weight and gestational age of mother

Gestational age of mother	No. of newborns with wt <2500gm	No. of newborns with wt ≥2500gm	Total	Risk of LBW (%)
<35 completed weeks	25	0	25	100%
35 completed weeks-35+6days	12	1	13	92.3%
36 completed weeks-36+6days	9	1	10	90.0%
37 completed weeks-37+6days	13	21	34	38.2%
38 completed weeks-38+6days	7	20	27	25.9%
39 completed weeks-39+6days	7	18	25	28.0%
40 completed weeks-40+6days	0	16	16	0%
Total	73	77	150	-

LBW=Low birth weight

Table 3 shows that if gestational age of mother is less than 35 completed weeks there is 100% risk of low birth weight of newborns. As the gestational age of mother increases the risk of low birth weight of newborns decreases, but after 39 completed weeks there is slight increase in risk of low birth weight this is due to placental insufficiency after 39 weeks.

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DISCUSSION

Out of one hundred fifty newborns seventy three (48.7%) is low birth weight. In a study in Bangladesh low birth weight newborns was 41%. [11] Kumar in 2012 reported in their study 55.27% was low birth weight, [12] hence data is near about same, but a study in 2003 in Lagos low birth weight was 17.56%. [13] This showed that incidence of low birth weight still high in developing countries than developed countries.

Our study reveals the range of age group of mothers was 19-38 years. The risk of low birth weight was higher in age group of 19-22. It decreases with increasing age of mother but further increases after the age of 30 years. Which was statistically significant (p=.04). A study done in 1977 by waly H G et al concluded that positive correlation was only found to be present between birth weight and family income below 10 pounds/month. A similar correlation was noticed between birth weight and the interpregnancy interval up to 30 months. The presentation of the foetus might be of influence on birth weight only in cephalic and breech presentation. The age of the mother, occupation, weight were negatively correlated with birth weight. [14]

We observed that as the socioeconomic status of parents improves the risk of low birth weight of newborns decreases. Maximum risk of low birth weight (61.2%) was in upper lower class. (p=.000) and less was in upper middle. It may be due to better nutrition. A study by Jeff and Stefanie in 2013 shows that maternal age patterns in LBW risk for African Americans differ from whites and foreign- and U.S.-born Hispanics. Background socioeconomic disadvantage, together with current socioeconomic status and smoking during pregnancy, explain almost all of the LBW disparity between white teenage mothers and their older counterparts. These findings suggest that social disadvantage is a primary driver in unfavorable birth outcomes among white teenage mothers compared to older white mothers.[15]

Literacy of parents increases the risk of low birth weight decreases. (p=.001) The risk was lower in literate group, because literate mothers could be expected to be aware of factors influencing pregnancy and enhancing the growth of foetus. As the work of the parents shifted from unskilled to skilled worker the risk of low birth weight decreases. (p=.002)

In our study we saw that as the income/month of parents increases the risk of low birth weight decreases. (p=.004) It may be due to better resources. A study done in 2015 shows that Confounding by Socio Economic Position explains much of the excess risk of LBW and preterm among babies born to teenage mothers as a whole, but not for mothers aged: < 16 and > 35 ages. Given that the proportion of women becoming pregnant at <16 years is smaller than for those >35 years, the population burden is greater for older age.[16]

If gestational age of mother is less than 35 completed weeks there is 100% risk of low birth weight of newborns. As the gestational age of mother increases the risk of low birth weight of newborns decreases, but after 39 completed weeks there is slight increase in risk of low birth weight. (p=.000)a study by Radha in 2013 concluded that the Results of multivariate analysis showed a U-shaped relationship between maternal age and LBW among whites, with the youngest (younger than 15) and the oldest (aged 40 and older) mothers being at high risk than 25-29 years old; older teenagers were not at any significantly higher risk. For the black, the risk of LBW rose steeply with maternal age (mothers aged 15-19 years are significantly lower risk than those of 25-29 years for LBW infants). [17]

CONCLUSION: Literacy of parents increases the risk of low birth weight decreases. Advancing maternal age is associated with a decreased potential for fetal growth, possibly reflecting biological aging of maternal tissues and systems or the cumulative effects of disease. Results of multivariate analysis showed a U-shaped relationship between maternal age and LBW

REFERENCES

1. Physical Status: the use and interpretation of anthropometry. Report of a WHO expert committee. WHO Technical Report Series, 1995, 854:121-160.
2. Ghai OP, Gupta P and Paul VK. Ghai's essential pediatrics, 6th edition, CBS Publisher & Distributors. New Delhi 2004; 128-129.
3. The World Health Organization report. The newborn health that went unnoticed, prenatal mortality. A listing of available information. World Health Organization, Geneva, 1996.
4. Blanc AK and Wardlaw T. Monitoring low birth weight: An evaluation of international estimates and an updated estimation procedure. Bulletin of the World Health Organization. 2005; 83: 178-185.
5. United Nations Children's Fund (UNICEF). The state of the world's children. 2005 New York.
6. United Nations Children's Fund (UNICEF). The state of the world's children. 2005 New York
7. Darmstadt GL, Bhutta ZA, Cousens S, Adam T, Walker N and de Bermis L. Lancet neonatal survival steering team: Evidence–based, cost–effective interventions: How many newborn babies can we save? Lancet. 2005; 365: 977-998.
8. Vidyasagar D. The newborn. Textbook of neonatology. 1st edition. Interprint. NewDelhi 1987; 5-8.
9. Mclntosh N, Helms P, Smyth R. Forfar and Arneil's. Care of newborn. Textbook of Pediatrics. 6th edition. Churchill Livingstone Elsevier. London 2003; 178-181.
10. Metcoff J. Fetal malnutrition and SGA are not synonymous. Clinical assessment of nutritional status at Birth. Journal of Pediatrics Clinics of North America, 1994; 41(5): 875-887.
11. Huque F and Hussain AM. Detection of low birth weight newborn babies by anthropometric measurements in Bangladesh. Indian Journal of Pediatrics, 1991; 58(2): 223-31.
12. Kumar S, Jaiswal K, Dabralm, Malhotra AK and Verma BL. Calf circumference at birth: A screening method for detection of low birth weight. Indian Journal of Community Health, 2012; 24(4): 336-341.
13. Ezeaka VC, Egri-Okawaji MT, Renner JK and Grange AO. Anthropometric measurements in the detection of low birth weight infants in Lagos. Niger Postgrade Medical Journal, 2003; 10(3): 168-172.
14. Waly HG, EI-Mazhy A, Abdel-Fattah H, Mahmoud F, EI-Allha, M ahfouz M. Birth weight in relation to maternal

socioeconomic status. Gaz Egypt peadiatr. Assoc., 1997; 26(1) : 7-11.

15. Jeff A. Dennis and Stefanie Mollborn. Young maternal age and low birth weight risk : an exploration of racial/ethnic disparities in the birth outcomes of mothers in United states. Soc. sci. J, 2013; 50(4): 625-634.

16. Maria clara restrepo-mendez, Debbie A Lwlow, BernardoL Horta. The association of maternal age with birth weight and gestational age: A cross cohort camparison. Peadiatric and perinatal epidemiology, 2015; 29: 31-40.

17. Radha Y Aras. Is maternal age risk factor for low birth weight weight? Archives of medicine and health sciences, 2013; 1(1): 33-37