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Study of incidence of low birth weight babies and its association with some confounding maternal factors

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Abstract
Mother's weight is a good index of her nutrition. It's well known that small or light mothers tend to produce a small baby and large mother's tends to larger baby. So the purpose of the study is to find out the incidence of LBW and maternal weight gain in 3rd trimester of pregnancy, height and her socio-economic status on to the birth weight. The study was conducted in obstetric wing of LLRM Medical College. The patients that attended antenatal clinic and booked cases delivered retrospectively are included in the study book (100 singleton pregnancies). All the observations in the study were evaluated statically Chi-Square test. The incidence of LBW in our study is 30%. The critical height of the mother is less than 150 cms for LBW. Mother's with excessive weight gain more than or equal to 6 Kg or insufficient (1 to 3 Kg) weight gain in 3rd trimester in pregnancy gave birth to LBW's. Mother's belonging to high socio-economic class (Class I & II as per updated Gupta & Mahajan Socio-Economic classification) delivered NBW's.

Keywords: LBW- Low Birth Weight, NBW- Normal Birth Weight

1. Introduction
During 1st trimester of pregnancy organogenesis is the predominant event and the foetal mass increases slowly. 2nd trimester witnesses maximum growth in length besides maturation of the organs. The 3rd trimester witnesses is characterised by rapid weight gain therefore the evaluation of weight gain during 3rd trimester may prove an effective method of assessing the nutritional status, the neonatal outcome and indirectly the socio-Economic status of the mother. So the purpose of the study is to find out the incidence of LBW and maternal weight gain in 3rd trimester of pregnancy, height and her socio-economic status on to the birth weight.
The association between maternal height and LBW has been recognised (Baird & Donnelly *et al.*). Maternal height has a definite association with social class. In the British Perinatal Mortality Surveys, there were 40.9% tall women among Social Class I, but only 26% among Social Class IV & V. Fedrick & Adelstein (1978) [6] found 3 times more incidence of LBW with maternal height less than 154 cms.
According to Abrams *et al.* (1995) the most important determinant of weight gain per trimester were age and ethnicity in the 1st trimester, parity and height in the 2nd trimester and hypertension, age and parity in the 3rd trimester. Johnton *et al.* (1992) [1], supports the conclusion inferred by Abrams *et al* suggesting good pregnancy outcome is based on new born's birth weight and maternal weight gain. Beilly J.S & Kurland showed a positive co-relation between maternal weight and birth weight. Firkee *et al.* (1994) [3]**.** in their community base study in Karachi showed that, among the significant biological factor low maternal weight was important.
Radhakrishnan *et al.* (2000) [8]**.** Noted low maternal socio-economic status s principal of LBW babies.

2. Materials and Method
The study was conducted in obstetric wing of LLRM Medical College. The patients that attended antenatal clinic and booked cases randomly delivered retrospectively are included in the study book (100 singleton pregnancies). The study cases were

- Mothers who came for delivery to SVBP hospital(Singleton pregnancies)
- Their baby's (Live born babies) birth weight
- Maternal parameters

a) Mother's height measured in metric system maintaining the accuracy up to 0.5 cm as per ICMR standard.
b) Mother's weight gain in 3rd trimester as per antenatal records
c) Socio-economic status of the family as per capita income per month. Calculated according to upgraded Gupta & Mahajan Scale.

- Delivery data means mode of delivery (spontaneous normal vaginal or forceps or caesarean section).
- Neonatal birth weight was measured to the nearest of 20 gm on a standard weighing machine 10 kg calibration, the accuracy of which was checked from time to time. All the observation in the study were evaluated statistically by Chi-Square test ($\chi 2$ test) to test the difference of the two proportions.

3. Result

The incidence of LBW in our study is 30%. The critical height of the mother is less than 150 cms for LBW. Mother's with excessive weight gain more than or equal to 6 Kg or insufficient (1 to 3 Kg) weight gain in 3rd trimester in pregnancy gave birth to LBW's. Mother's belonging to high socio-economic class (Class I & II). The observations are shown in the following tables and charts.

Table 1: Effect of Maternal Height on Birth Weight

Height Of The Mother (In Cms)	LBW's		NBW's		Total No. Of Cases	LBW%	NBW%
	No	%	No	%			
145-150	9	30	18	25.71	27	33.33	66.67
151-155	17	56.67	39	55.71	56	30.36	69.64
156-160	4	13.33	13	18.58	17	23.53	76.47
Total	30		70		100		

$X^2(1) = 0.04$
$p>0.05$, Statistically Insignificant

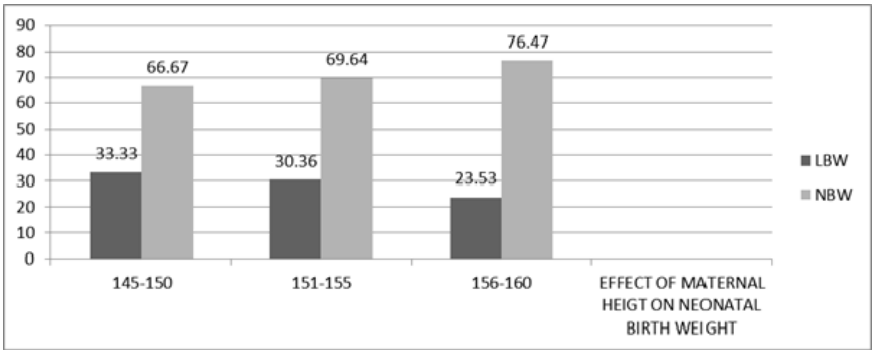

Chart 1: Effect of Maternal Height on Neonatal Birth Weight

Table 2: Effect of Maternal Weight Gain in 3rd Trimester on Neonatal Birth Weight.

Weight Gain By Mother In 3rd Trimester (In Kg)	LBW's		NBW's		Total No. Of Cases	LBW%	NBW%
	No	%	No	%			
1-3	14	46.67	36	51.43	50	28	72
4-6	10	33.33	60	42.86	40	25	75
≥ 6	6	20	4	5.71	10	60	40
Total	30		70		100		

X^2 (1) = 1
$p>0.05$, Statistically Insignificant

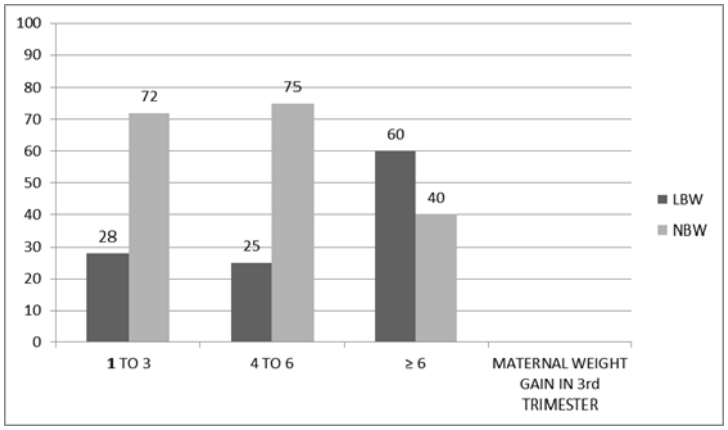

Chart 2: Effect of Maternal Weight Gain in 3rd Trimester on Birth Weight

Table 3: Effect of Socio-Economic Status on Neonatal Birth Weight

Socio-Economic Status Per Capita Income(In Rs) Per Month	LBW's		NBW's		Total No. Of Cases	LBW%	NBW%
	No	%	No	%			
Class I (>1600)	0	0	2	2.86	2	0	100
Class II (1000-1599)	1	3.33	11	15.71	12	8.33	91.67
Class III (500-999)	3	10	13	18.57	16	18.75	81.25
Class IV (200-499)	9	30	16	22.86	25	36	64
Class V (<200)	17	56.67	28	40	45	37.78	62.22
TOTAL	30		70		100		

X^2 (1) = 1.73

p>0.05, Stasistacilly Insignificant

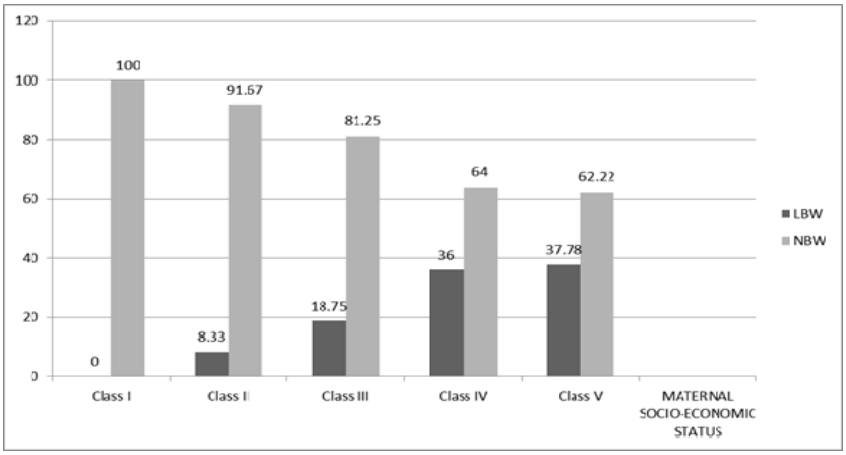

Chart 3: Effect of Socio-Economic Status on Neonatal Birth Weight

4. Discussion

The present study showed that there was great incidence of LBW's in mothers having height of ≤ 150 cms. However this relationship was statically insignificant (*p*>0.05) shown in table 1.

This is in agreement with results shown by Bhatia *et al.* (1984) [7] who found 40% incidence of LBW's with mother's height > 148.2 cms. The study of Trivedi & Mavalankar (1986) [9] elucidates that epidemiological features showed incidence of LBW's 20.37% with mother's short height 152.5 cms while mothers more than or equal to 152.5 cms gave babies of birth weight more than 2.5 kg.

The literature is also revealing conflicting reports about significance of maternal height and neonatal birth weight. The present study found an inverse but insignificant relationship as observed by many workers. This may be due to small sample size or influence of certain environmental, nutritional and socio-economic factors operative since early child hood of mothers.

The study revealed the maximum 60% of the LBW in mothers with excessive weight gain of more than or equal to 6 Kg in 3rd trimester of pregnancy. In contrast to preent study Beilly JS & Kurland showed that heavier women tend to have heavier infant.

Mukherjee & Biswas, Achar, Arora *et al*., Nadkarni & Udani reported a positive co-relation between low socio-economic status and increasing incidence of LBW babies. Radhakrishnan *et al.* (2000) [8]. Noted low socio-economic status as the principal determinant of LBW babies. As high socio-economic status had ample resources to meet nutritional requirements, healthcare, maternal care throughout the pregnancy and delivery. Under privileged mothers belonging to lower socio-economic groups had poor resources, disadvantages of poverty, ignorance, diseases, lack of adequate health care and poor living conditions leading to LBW babies.

5. Conclusion

1. The critical height of the mother is less than 150 cms for LBW.
2. Mother's with excessive weight gain more than or equal to 6 Kg or insufficient (1 to 3 Kg) weight gain in 3rd trimester in pregnancy gave birth to LBW's.
3. Mother's belonging to high socio-economic class (Class I & II as per updated Gupta & Mahajan Socio-Economic classification) delivered NBW's.

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