Original Article

A study of maternal factors and birth weight in a border District of Uttar Pradesh: A hospital based study

Kaushal SK[1], Misra SK[2], Gupta SC[3], Singh R[4],

[1]Assistant Professor, [2,3]Professor, Deptt. of PSM, [4]Associate Professor, Deptt. of Obs & Gynae, S. N. Medical College, Agra.

Abstract:

Background: Low birth weight is defined as the live births with less than 2.5 kg weight. LBW is one of the serious challenges in maternal and child health in both developed and developing countries.

Objective: (1) To study the proportion of low birth weight neonates among hospital based deliveries. (2) To evaluate selected maternal factors associated with low birth weight in institutionally delivered newborn.

Methods: A retrospective study was carried out in S.N. Hospital, Agra from 1st September, 2007 to 31st August, 2009 from medical record section of Obstetrics & Gynaecology department. Mode of delivery, birth weight and sex of baby, age of mother, parity, gestational period were taken as variables.

Statistical analysis used: Chi-square test was applied to observe the significance of association.

Results: Proportion of LBW was found to be 38% and was higher in teenage pregnancy, in Muslim females, in high parity and among newborn females.

Conclusion: Relationship of birth weight with sex of new born, birth order of new born, mode of delivery, gestational period and with parity of mother was found to be significant..

Key Words: birth weight, sex of baby, age of mother, parity, gestational period, mode of delivery.

Key Messages: Avoiding teenage pregnancy and promoting small families with appropriate gap between two births could lower down the prevalence of low birth weight.

Introduction:

Birth weight is an important determinant of child health. It is influenced by various factors like ethnicity, race, socioeconomic state, feto- placental factors and maternal factors during pregnancy. Low birth weight (LBW) children are not only responsible for a very large proportion of childhood mortality and morbidity, but also being incriminated for many chronic disease conditions in adult life[17]. Low birth weight is defined by WHO as "birth weight less than 2500 gm"[1]. LBW being one of the global indicators of community health, it is imperative that periodic monitoring be undertaken to evaluate the impact of preventive health services. LBW is one of the serious challenges in maternal and child health in both developed and developing countries. Global data on LBW indicate that prevalence of LBW is the highest in South Asian region [2] & in our country, it is about 30-35 %[3]. Present study was conducted in S.N. Hospital, Agra, as an attempt to assess the proportion of LBW among institutional delivery and to investigate some maternal factors on the birth weight of these newborns.

Subjects and Methods:

The present retrospective study was carried out in S.N. Hospital, Agra which is a training hospital, associated with S.N. Medical College Agra. The data was collected for 2 years duration i.e. from 1st September, 2007 to 31st August, 2009.The information were collected from record register, taken from medical record section of obstetrics and gynaecology department which maintain all the information of indoor patient. The data was collected by resident of SPM department with the help of interns posted in the department. The required information related to study variable i.e. type of delivery, mode of delivery, birth weight and sex of baby, age of mother, parity, gestational period were entered in pre-designed schedule. Baby of mothers severally ill, having any medical problem like PIH, severe anaemia and dead born, still born, and multiple births were excluded from the study. Rest of all the deliveries occurred during the study period were included. The data thus collected were compiled and analyzed & appropriate statistical tests were applied.

Address for Correspondence:
Dr. Suneel Kumar Kaushal, Assistant Professor, S. N. Medical College, Agra.
E-mail ID: dr.suneel31@rediffmail.com

Results:

During the study period a total of 2504 deliveries occurred of which 2396 were taken as per our inclusion criteria. Among study group newborns, 1302 were males and 1094 were females, thus giving sex ratio as 840 females over 1000 males, of these newborns 38% were below 2.5 kg i.e. low birth weight (LBW). Majority of newborns were having birth weight between 2-3kg (67.24%).The proportion of LBW is more among female child (41.78%) as compared to male (35.41%). Majority of LBW babies belonged to Muslim mothers and to birth order 4th and above.

It was seen that the proportion of low birth weight was higher in teenage pregnancies (43.43%) and also in the age group of >30 years (41.62%).

It was seen that the percentage of low birth weight increased with an increase in parity. Primipara mothers were comparatively at lower risk (38.06%) of delivering LBW babies as compared to multi-para mothers (61.94%).

Outcome of caesarean section was better than normal vaginal deliveries, 34.51% babies born by LSCS were low birth weight as compared to 41.89 % delivered by normal vaginal route. There was huge difference in birth weight of term and preterm babies, 64 % preterm while just 30 % term babies were lbw.

Table 1: Birth Weight and Bio- Social Factors

Factors	Birth Weight							Total
Sex	<1	1-1.5	1.5-2	2-2.5	2.5-3	3-3.5	>3.5	
Male	7(0.54)	34(2.61)	100(7.68)	320(24.58)	538(41.32)	238(18.28)	65(5.00)	1302
Female	14(1.28)	33(3.02)	101(9.23)	309(28.25)	444(40.58)	155(14.17)	38(3.47)	1094
$\chi^2=18.233$, df=6, $p<0.05$								
Religion								
Hindu	17(0.82)	58(2.80)	167(8.07)	545(26.33)	849(41.01)	347(16.77)	87(4.20)	2070
Muslim	4(1.24)	9(2.79)	34(10.53)	83(25.70)	132(40.87)	45(13.93)	16(4.95)	323
Others	-	-	-	1(0.33)	1(0.33)	1(0.33)	-	3
$\chi^2=2.116$, df=6, $p>0.05$								
Birth Order								
I	4(0.57)	16(2.30)	52(7.45)	211(30.23)	281(40.26)	101(14.47)	33(4.73)	698
II	10(1.49)	17(2.53)	47(6.99)	158(23.51)	295(43.90)	117(17.41)	28(4.17)	672
III	3(0.59)	13(2.56)	46(9.07)	122(24.06)	217(42.80)	86(16.96)	20(3.95)	507
IV & Above	4(0.77)	21(4.05)	56(10.79)	138(26.59)	189(36.42)	89(17.15)	22(4.24)	519
$\chi^2=29.383$, df=18, $p<0.05$								

Table 2: Birth Weight and Maternal factors

Maternal Factors	Birth Weight(kg)							
Age (years)	**<1**	**1-1.5**	**1.5-2**	**2-2.5**	**2.5-3**	**3-3.5**	**>3.5**	Total
<20	3(0.75)	12(3.03)	37(9.34)	120(30.03)	160(40.40)	46(11.01)	18(4.45)	396
21-30	17(0.93)	49(2.69)	145(7.98)	458(25.23)	757(41.70)	314(17.30)	75(4.13)	1815
>30	1(0.54)	6(3.24)	19(10.27)	51(27.56)	65(35.13)	33(17.83)	10(5.40)	185
Total	21(0.88)	67(2.80)	201(8.39)	629(26.25)	982(40.98)	393(16.40)	103(4.30)	2396
$\chi^2 = 15.278$, df=12, p>0.1								
Type of Delivery								
LSCS	8(0.69)	27(2.32)	81(6.97)	285(24.52)	494(42.51)	210(18.07)	57(4.91)	1162
Normal	13(1.05)	40(3.24)	120(9.72)	344(27.88)	488(39.55)	183(14.83)	46(3.73)	1234
Total	21(0.88)	67(2.80)	201(8.39)	629(26.25)	982(40.98)	393(16.40)	103(4.30)	2396
$\chi^2 = 17.727$, df=6, p<0.05								
The association between low birth weight and type of delivery is not clear, whether author wants to see the effect of type of delivery on low birth weight or vice versa.								
Gestation Period (weeks)								
Preterm (<37)	15(2.66)	45(7.98)	118(20.92)	188(33.33)	151(26.77)	34(6.03)	13(2.30)	564
Term (37-42)	6(0.33)	22(1.22)	83(4.59)	436(24.09)	824(45.52)	356(19.67)	83(4.59)	1810
Post-term (>42)	-	-	-	5(22.73)	7(31.82)	3(13.64)	7(31.82)	22
$\chi^2 = 338.095$, df=6, p<0.05								
Parity								
Primi-para	7(0.77)	25(2.74)	53(5.81)	335(36.73)	335(36.73)	120(13.16)	37(4.06)	912
multipara	14(0.94)	42(2.83)	148(9.97)	294(19.81)	647(43.60)	273(18.40)	66(4.45)	1484
Total	21(0.88)	67(2.80)	201(8.39)	629(26.25)	982(40.98)	393(16.40)	103(4.30)	2396
$\chi^2 = 89.426$, df=6, p<0.05								

Discussion:

The present study was performed in S.N. Hospital, Agra. Agra is situated in the western region of U.P. Its boundaries touches with Bharatpur & Dholpur District of Rajasthan and Gwalior & Bhind district of M.P. Being a border interstate district, Agra bears burden of health problems of surrounding districts belonging to other state as well. In our study we have found the proportion of LBW as 38 %. The data from NFHS-3[4] observed it to be 21.5%. Higher proportion in our study could be due to the fact that usually high risk cases come for delivery in hospital setting. A Kolkata based study[5] has recorded prevalence of LBW as 28.6%. In the present study, majority of the population was Hindus. It was observed that the proportion of low birth weight was slightly more in Muslims than in Hindus; however the difference was not statistically significant. Proportion of LBW in case of birth order one was lower in the present study as compared to that for birth order 2-3 which is similar to findings of NFHS -3 survey[4]. The percentage of teenage pregnancy was found to be 43.43%. The proportion of low birth weight was high in these cases. These results corroborate findings from other studies by Hugh S Miller et al[6], BK Dass et al[7] and R Aras et al[8]. The birth weight improved with an increase in maternal age but females above 30 years also constituted a risk factor for low birth weight. Maternal age above 30 years as risk factors found in this study do not agree with respective findings of NFHS-3 survey[4]wherein younger and primi mothers were found to be at higher risk of delivering LBW babies. The optimum age of child bearing is 20-30 years and pregnancy should be avoided in extremes of ages. Young age of mother and inadequate development of uterus can cause low birth weight babies. In elderly parous females, low birth weight is the result of increased vascular changes and low nutritional status. In United States, the percentages of preterm births and LBW rose to 12.0% and 7.8% respectively in 2002, from 9.4% and 6.7% in 1984[9]. In our country, approximately one third LBW neonates are premature[10]. Such infants constituted 64.89 % in our study. This higher percentage population of premature infants may be because of an overall high age of mothers. The proportion of premature babies varied from 21.6% in Nepal[5] to 61.2% in Ahmedabad, India[11]. In this study, it was observed that parity and low birth weight were co-related. Proportion of low birth weight increased with an increased in parity. This may be due to the fact that a large number of children are born without adequate spacing, leading to depletion in the woman's nutritional status and health, leaving her incapable of producing a healthy baby. These findings are consistent with the findings by earlier workers like AMA Ferreira et al[12], Enrique Regidor et al[13], Silvia de Saryose et al[14], Mavalankar et al[15] and Kamala Das et al[16]. It was apparent from the tables as LSCS had better outcome in terms of birth weight compared to normal vaginal route but this may be because of the fact that high risk cases undergo for elective caesarean section and receive better antenatal care.

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