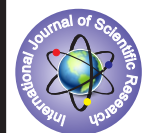# "CORRELATION BETWEEN MATERNAL ANTHOPOMETRIC FACTORS AND BIRTH WEIGHT IN LOW BIRTH WEIGHT BABIES"

Paediatrics

Dr Urmila M. Chauhan	MBBS, MD (Paeds), Associate Professor, Dept. of Paediatrics, GMC Nagpur (MS), India.
Dr Sandeep M Bhelkar	MBBS. MD. (Community Medicine), Associate Professor in Community Medicine, Shri.Vasantrao Naik Governemnt, Medical College Yavatmal (MS), India.
Dr. Pravin Dahake	DCH, DNB (Paeds), Consultant Pediatrician and Neonatologist, Lata Mangeshkar hospital, Nagpur, (MS).India.

ABSTRACT

Background: Low birth weight is one of the most serious challenges in maternal and child health, in both developing and developed countries. There is a strong and significant positive correlation between maternal nutritional status and length of pregnancy and birth weight. Against this background present study was planned to study the correlation between maternal anthropometric factors and birth weight and to find out prevalence of low birth weight babies. **Material and method:** The present study was carried out in a municipal hospital with level two nursery facility over a period of one year. There were total 1154 birth during one year study period. Total 240 low birth weight babies meet the inclusion criteria of study. Maternal anthropometric parameters were compared with the birth weight of babies using correlation coefficient.**Result:** In present study 55.42% were males while 44.58% were females. There was a positive correlation Coefficient (r value 0.324066) between maternal age and birth weight. There was positive linear correlation between mother's pre-pregnancy weight and birth weight; the r value was 0.3234298846. Birth weight shows increasing trends as the mother weight increases. The relationship between maternal height and birth weight is statistically significant, r values was 0.232164. As the height increased birth weight also showed similar trend. Higher maternal Hemoglobin (Hb) levels correlated well with better Mean Birth weight (MBW) of babies, and there was a positive correlation between them and the "r value" being 0.323871.**Conclusion:** Maternal age, pre-pregnancy weight, weight gain during pregnancy, maternal height and maternal hemoglobin level had shown positive correlation with birth weight of babies. **Recommendation:** Major emphasis should be given for proper ANC care and especially for nutritional status of mother during ANC period

Introduction

Low birth weight is defined by World Health Organization as a birth less than 2500g irrespective of period of gestation since below this value birth weight specific infant mortality begins to rise rapidly[1,2,3]. There is, however, a great variation in the mean birth weight (MBW) in babies born amongst different parts of the world. Low birth weight is one of the most serious challenges in maternal and child health, in both developing and developed countries. The birth weight is the single most determinant of child's survival, healthy growth and development[4]. The causes of LBW have been the focus of investigations over the last few decades. It is now acknowledged that the etiology is multi-factorial and interrelated to mother, placenta and the fetus. The health of mothers greatly influences the health, development and well being of their children. There is a strong and significant positive correlation between maternal nutritional status and length of pregnancy and birth weight. Against this background present study was planned to study the correlation between maternal anthropometric factors and birth weight and to find out prevalence of low birth weight babies.

Material and method

The present study was carried out in a municipal hospital with level two nursery facility over a period of one year. It was a retrospective descriptive study. The babies with birth weight less than 2500g (as Defined by World Health Organisation) were included in the study. There were total 1154 birth during one year study period and and 240 low birth weight babies meet the inclusion criteria of study. All babies were singleton, vaginally delivered and did not have congenital anomalies and mother of babies were apparently healthy. Exclusion criteria were maternal illness (Heart diseases, renal disease and TORCH infection etc.), surgical complications in mother, obstetric complication (Preeclampsia, eclampsia, abortion, etc) placenta previa or babies with congenital anomalies.

The details of mother's past medical and obstetrics events as well as her social data were obtained in prestructured proforma. It includes maternal age, weight of mother at the time of 1st antenatal checkup (ANC) visit and at the time of delivery, height of the mother, hemoglobin level at the time of 1st ANC registration. The hemoglobin level were measured at the time of delivery also. Body mass Index was calculated by standard formula BMI=Wt (kg)/Ht(m)^2. Also information regarding education, family income occupation and number of family members were collected.

Various maternal parameters as age, weight, height, Body mass index, parity, socioeconomic status and adequacy of antenatal care were compared with birth of newborn. Statistical analysis was done for correlation amongst two parameters using correlation coefficient° value)

RESULTS

The present study was conducted over a period of one year. There were 1328 live birth during this period. Total 320 low birth weight delivered from which 80 cases were excluded from the study as per exclusion criterion. The prevalence of LBW was there for 27.72% In this study 240 cases were analyzed.

Table .1 Correlation between Gestational age and sex distribution									
Sex	No.cases			Gestational age					
	Total	%	Mean Birth weight	Less than 37 weeks			37 weeks and above		
				No. of cases	%	MBW	No. of cases	%	MBW
Male	132	55.42	2028	43	17.92	1688	89	37.5	2193
Female	108	44.58	1936	35	15	1666	73	29.58	2065
Total	240	100	1987	78	32.92	1678	162	67.08	2135

Table 1 showed gestational age and sex distribution. 55.42% were males while 44.58% were females. The incidence of prematurity was nearly same in both males and females. Out of which 32.92 % mother delivered prematurely whereas 67.08% delivered after 37 weeks of gestation. The mean birth weight was higher in males than in females.

Table 2. Correlation between maternal age and low birth weight									
Mothers Age (years)	No.cases			Gestational age					
	Total	%	Mean Birth weight	Less than 37 weeks			37 weeks and above		
				No. of cases	%	MBW	No. of cases	%	MBW
< 20	18	7.50	1871	8	3.33	1522	10	4.16	2100

20 – 24	119	49.50	1991	33	13.75	1720	86	35.83	2150
25 – 29	76	31.66	1995	28	11.66	1656	48	20	2193
30 – 34	23	9.58	2013	7	2.97	1691	16	6.66	2153
>= 35	4	1.60	1970	2	0.80	1890	2	0.08	2050
Total	240	100	1987	78	32.91	1678	162	67.08	2135

Table 2 shows relationship between maternal age and birth weight of new born. It was observed that about 81% mother were in the age group of 20-29 years. Mother < 20 years had babies with lowest birth weight with MBW 1871 gms. The correlation Coefficient (r value) calculated between age and birth weight was 0.324066, indicating a positive relationship.

Table 3: Correlation between mother weight and LBW

Mothers weight (kg)	No of cases	%	MBW (g)
< 40	43	17.91	1711.62
40- 44	78	32.50	1945.6
45-49	88	36.66	2075.2
50 – 54	24	10.0	2088.2
55- 59	5	2.08	2118
>= 60	2	0.83	2400
Total	240	100	1987

The correlation between Low birth weight and maternal weight shown in table 3.Out of 240 mother 209(87.08%) mothers were below 50 kg, which is the reference standard for Indian women as set by ICMR. There was positive linear correlation between mother's prepregnancy weight and birth weight; the r value was 0.3234298846. Birth weight shows increasing trends as the mother weight increases.

Table 4 Correlation between mother height and low birth weight babies

Mothers height (Cm)	No of case	%	MBW
145 -149	43	17.91	1912.6
150- 154	82	34.16	1967.4
155- 159	66	27.50	2069.69
>= 160	35	14.58	2142.85
Total	240	100	1987

Table 4 showed correlation between mothers height and low birth weight. The relationship between maternal height and birth weight is statistically significant, r values was 0.232164. As the height increased birth weight also showed similar trend.

Table 5 correlation of maternal weight during pregnancy and low birth weight

Weight gain (kg)	No of cases	%	Mean weight gain	MBW
<=6.0	20	17.85	5.8	2102
6.1 – 8.0	69	61.6	7.94	2180
8.1 – 10.0	19	16.96	9.18	2203
>10.0	4	3.72	10.75	2370
Total	112	100	7.87	2187

The relationship between birth weight and weight gain during pregnancy is shown in table 5 those mother who registrerd during 1st trimester and delivered term babies were only considered. Hence, 112 cases could be analysed. The weight gain was calculated as the difference between weight at ANC registration and weight at delivery. The average weight gain was 7.87kg. There was a linear relationship between maternal weight gain and birth weight.

Table 6 Correlation between Anemia and LBW

Hb(Gm %)	No of cases	%	MBW (GM)
< 7.0	17	7.08	1663.5
7.0 – 8.9	85	35.41	1927.2
9.0 – 10.9	106	44.16	1953.3
>= 11.0	32	13.33	2112
Total	240	100	1987

Table 6 showed 88.66% of mother were anemic by definition (WHO).Out of these 7.08% of them had severe anemia. Higher maternal Hb levels correlated well with better MBW, and there was a positive correlation between them and the "r value" being 0.323871

Discussion

In present study the 27.72 % babies born were Low birth weight. This is much higher than reported in NHFS 2 as present study only included the mother who was registered for convenient easy availability of their health data.

In present study, the proportion of males was higher than that of females. The incidence of prematurity was similar (32.50%) in males as well as females. Also mean birth weight was found to be higher in males than females. The male- female weight difference was 92 g. These finding corroborate with the findings in WHO Bulletin Review Analysis[5], where male-female difference of birth weight was 93.1 g and the ratio of male was mentioned to be slightly higher than female. Banik et al[6] reported similar finding, where the mean birth weight of infant (all groups) was higher in males than in females. Dougherty et al[7] found a mean birth weight of 118 g lower for females compared to males. Ghosh et al[8], Lubchenco et al[9], Gruenwald[10] ,Banik el at, Udani et al[11] Bhakoo et al[12] also reported similar finding.

It was observed that about 81% mother were in the age group of 20- 29 years. Mother < 20 years had babies with lowest birth weight with MBW 1871 gms. There was positive relationship between maternal age and birth weight up to 35 years but after that the MBW declines as mother age advances. The incidence of premature babies was found to be low in the mother in age groups 20-34 years and higher in the mother in age groups less than 20 years and those above 35 years. Banik et al reported that MBW of babies increased systematically up to 30 years and thereafter it decreased with increased maternal age.he also stated that the incidence of LBW was higher in mother up to 20 years and ther was sudden drop im the age group of 21- 25 years and thereafter it increased again.

Mukherjee et al[13] reported that the birth weight increased systematically with increasing age of the mother up to the age 25 years, but at higher ages this relationship was somewhat reversed. Sen et al[14] observed that birth weight reached its peak when the age of the mother was between 26- 37 years and thereafter it diminished. Makhijak et al[15],Elster et al[16], Lee et al[17] , kumara et al observed that young mother (<20 years) were found to be deliver more number of LBW babies. Tripathi et al[18] observed that the weight gains as well as the birth weight were inferior in women under 20 years of age and in primipara and there was an increase in birth weight with age and parity. One of the key massage in "Facts foe Life" [19] states that pregnancy before the age of 18 or after the age of 35 years increases the risk for the mother and the baby.

In present study 209 out of 240 mothers were in the age group of <50 Kg, which is the 50th percentile as per ICMR standards. The mean birth weight showed direct relationship with maternal weight. Those women who have chronic malnutrition of long standing before pregnancy deliver low birth weight 67.Several studies[19,20,21,22,23]had also shown statistically significant relationship between maternal weight and low birth weight .The poorly nourished and anemic mother give birth to small offsprings[24].In present study there observed a direct relationship between maternal height and birth weight of babies. Similar findings were also reported by Tripathi et al[25]. Nurul Amin[26] reported that the mothers with height lss than 150 cm delivered more number of LBW babies.

It was observed in present study that only 13.33 % mothers had normal Hb status as per WHO criterion.86.66% mother were anemic and 7.08 % had severe anemia. Her was steady increase in mean birth weight of babies with increasing maternal hemoglobin status. Edwards et al[27] reported that anemia in combination with underweight status prior to pregnancy was found to be pregnancy was found to be associated with a fivefold increase in the incidence of LBW infants.

Conclusion

In present study low birth weights was 27.72 % as study only included the registered ANC cases at UHTC. That could be reason for high level of LBW percentage. There was a positive correlation between maternal age and mean birth weight up to 35 years; beyond it MBW declined with increasing maternal age. There was a positive correlation with maternal weight and birth weight of babies. The relationship between the birth weight and maternal height was linear and statistically significant. A significant number of mothers (86.66%) were anemic. There was a direct relationship between mother's hemoglobin status and low birth weight.

Recommendation:

Major emphasis should be given for proper ANC care and especially for nutritional status of mother during ANC period. Those mother having less height measurement should be focused so as to at least their nutritional can be improved during ANC care.

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