"A study to assess correlates of low birth weight (LBW) in peri-urban area of Chandigarh, India"

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ABSTRACT
INTRODUCTION: - Birth weight of the baby is an important indicator of reproductive health and general health status of population. LBW is considered   the single most important predictor of infant mortality, especially of deaths within the first month of life. Since we don't have any data regarding low birth weight and its associated factors in this area so the present study was conducted.
MATERIALS AND METHODS: The study was conducted at RHTC under the Department of Community Medicine of Govt. Medical College, Chandigarh where female health workers from Department of Health of Chandigarh Administration are also posted.
RESULTS: - Out of these the prevalence of low birth weight was 11.7 % for males and 19.5% for females. Total prevalence of LBW babies was found to be 15.5%.
KEY WORDS: Correlates; LBW; Chandigarh.

Introduction:

Birth weight of the baby is an important indicator of reproductive health and general health status of population. LBW is considered   the single most important predictor of infant mortality, especially of deaths within the first month of life.   It continues to remain a major public health problem worldwide especially in the developing countries. As per the WHO estimation about 25 million low birth weight babies are born each year, nearly 95% of them in developing countries. Across the world, neonatal mortality is 20 times more likely for LBW babies compared to heavier babies (≤2.5 kg). [1] There are numerous maternal and fetal factors contributing to LBW. Weight at birth is

directly influenced by general level of health status of the mother. Maternal environment is the most important determinant of birth weight, and factors that prevent normal circulation across the placenta cause poor nutrient and oxygen supply to the fetus, restricting growth. The maternal risk factors are biologically and socially

interrelated; most are, however, modifiable. Kramer has identified 43 potential factors for low birth weight. [2] Not that all the factors, should be

present in a given area. The factors vary from one area to another, depending upon geographic, socioeconomic and cultural factors. The magnitude of low birth weight can be reduced if the maternal risk factors are detected early and managed by simple techniques.

Since the problem is multifactor, there is no universal solution. Since we don't have any data regarding low birth weight and its associated factors in this area, the present study was conducted with the following aims and objectives.

Aims and Objectives:

- To find out the proportion of low birth babies (LBW) out of total births.
- To study association of LBW with the maternal weight and height.
- To study how anemia, visits and LWB are associated.

Materials and Methods:

The Chandigarh is home for three Governments and has only one district of population just about eleven lakhs.

Hence its socio-economic status is very good. It has very good wider roads enabling the people to have quick access to health facilities.

The study was conducted at RHTC under the Department of Community Medicine of Govt. Medical College, Chandigarh where female health workers from Department of Health of Chandigarh Administration are also posted.

The maternal and Child Health Care (MCH) services are thus carried out by the mutual collaboration of Department of Medical Education and Department of Health along with its inherent benefits and drawbacks.

The registers pertaining to antenatal care, however, are very well maintained since there completeness and thoroughness is frequently supervised by Female Health Supervisors and faculty members.

The involvement of medical students in getting the antenatal mothers registered and investigated also added in strengthening the data management.

The data (year 2012-13 and 2013-14) regarding haemoglobin status, maternal age, weight, height, birth order, number of visits and birth interval was collected and their association with LBW was analysed by calculating percentages and using Chi square test. Haemoglobin was measured by cynmethhaemoglobin method.

Results:

The data in relation to weight of 405 (Male 204, Female 201) babies born at peri-urban area was analyzed.

Out of this in case of 7 male babies and 6 female babies birth weight was not recorded and hence final analysis was done for 392 (197 male, 195 female) babies.

Out of these the prevalence of low birth weight was 11.7 % for males and 19.5% for females. Total prevalence of LBW babies was found to be 15.5%.

Majority of babies (12.5%) were delivered from mothers (having low hemoglobin status (less than 11 gm %) . association between birth weight and hemoglobin status was found to be insignificant. ($p > 0.05$). (table 1)

Table :1 Association of Birth weight with anemia in pregnant women

Birth Weight	Hb <11	Hb ≥ 11 gm%	Total	ND	Grand Total
< 2.5	33 (12.5)	10(10.6)	43(12.0)	18(52.9)	61(15.5)
≥ 2.5	231(87.5)	84(89.4)	315(87.9)	16(47.0)	331(84.4)
Overall	264(100)	94(100)	358(100)	34(100)	392(100)

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$$X^2 = 0.23 \qquad P = 0.63$$

Majority of low birth weight babies (22.5%) were born from the mothers having weight less than 50 kg. Association between birth weight and weight of mothers have been found to be very highly significant (p< 0.01). (table 2)

Table:2 Association of Birth weight with maternal weight

Birth Weight	< 50 Kg	≥ 50 kg	Total	NM	Grand total
< 2.5	41(22.5)	17(9.9)	58(16.4)	03(7.9)	61(15.6)
≥ 2.5	141(77.5)	155(90.1)	296(83.6)	35(92.1)	331(84.4)
Overall	182(100)	172(100)	354(100)	38(100)	392(100)

$$X^2 = 10.32 \qquad P = 0.001$$

Majority have mothers (61.48%) have gone through 3 or more than three anti natal checkups. No significant association has been found between numbers of required visits as ANC and birth weight of babies. (table 3)

Table:3 **Association of birth weight with number of visits at Health center**

Birth Weight	ANC visits < 3	ANC visit ≥ 3	Total	NM	Grand total
< 2.5	25(16.5)	36(14.9)	61(15.6)	00	61(15.6)
≥ 2.5	126(83.4)	205(85.1)	331(84.4)	00	331(84.4)
Overall	151(100)	241(100)	392(100)	00(100)	392(100)

$$X^2 = 0.19 \qquad P = 0.66$$

Height of mothers were measured and 226 (57.65%) mothers were having height more than 5 feet. Similarly no significant association has been found out between height of mother and birth weight of babies. (table 4)

Table : 4 **Association of birth weight with height of mother**

Birth Weight	Ht up to 5 feet	Ht more than 5 feet	Total	NM	Grand total
< 2.5	26(18.4)	35(15.5)	61(16.6)	00	61(15.6)
≥ 2.5	115(81.6)	191(84.5)	306(83.4)	25(100)	331(84.4)
Overall	141(100)	226(100)	367(100)	25(100)	392(100)

$$X^2 = 0.55 \qquad P = 0.45.$$

Majority of low birth weight babies (70.3%) got delivered from mothers from birth interval was less than 2 years and association between birth interval and weight of babies was found to be significant (p<0.05). (table 5)

Table: 5 **Association of birth weight with the birth interval**

Birth Weight	BI< 2 yrs	BI ≥ 02 yrs	Total	NE	Grand Total
< 2.5	90(29.7)	15(15.5)	34(21.1)	27(11.7)	61(15.5)
≥ 2.5	45(70.3)	82(84.5)	127(78.9)	204(88.3)	331(84.4)
Overall	64(100.0)	97(100.0)	161(100.0)	231(100.0)	392(100)

$$X^2 = 4.68 \qquad P = 0.03$$

Majority of babies (30.86%) were delivered from mothers having age more than 20 years. Association between birth weight and age of mother was not found to be significant.(p> 0.05). (table 6)

Table: 6 **Association of birth weight with mother's age at first pregnancy**

Birth Weight	Upto 20 yrs	$\geq$20 yrs	Total	ND	Grand Total
< 2.5	06(26.1)	19(15.7)	25(17.4)	36(14.5)	61(15.5)
$\geq$ 2.5	17(73.9)	102(84.3)	119(82.6)	212(85.5)	331(84.4)
Overall	23(100.0)	121(100.0)	144(100.0)	248(100.0)	392(100)

X^2=1.15   P=0.22

Majority of low birth weight babies (23%) were delivered from the mothers where birth order was 3 or more than 3. Association between birth order and birth weight was found to be insignificant (p > 0.05). (table 7)

Table: 7 **Association of birth weight with birth order.**

Birth Weight	1	2	3 or More	Total	Grand Total
< 2.5	21(14.0)	17(12.4)	23(23.0)	61(15.8)	61(15.5)
$\geq$ 2.5	129(86.0)	120(87.6)	77(77.0)	326(84.2)	331(84.4)
Overall	129(100.0)	150(100.0)	137(100.0)	100(100.0)	392(100)

X^2= 5.45   P= 0.065

Discussion:

In a recent analysis of 2001, the UNICEF and the WHO had estimated the incidence of LBW neonates in India from the census report of 2001. The data revealed that the percentage of LBW neonates in India was 21.8% among a total number of 8 081 000 neonates per year.[3]

Birth weight is a very important indicator for both mortality and morbidity of the neonate. The proportion of low birth weight came out to be 15.5 %. The proportion of low birth weight came out to be 35.06%.[4] the total number of LBW babies during the study period was 130 (18.3%).[5]

Khatib et al, Agarwal et al, Kaushal et al found higher percentage comparable with present study.[6-8] Som et al, Mumbare et al found more or less same percentage of low birth weight than in present study. [9, 10] Majority of babies were delivered from mothers having age more than 20 years. Association between birth weight and age of mother was not found to be significant. The proportion of low birth weight babies was higher in teenage mothers.[4] This finding corroborates finding from other studies done by Agarwal et al, Kaushal et al. Som et al, Deshpande et al, [7-9,11] whereas Mumbare et al, Mavalankar et al, Acharya et al found no association between age of mother and birth weight of baby. [11,12,13] Majority of low birth weight babies were delivered from the mothers where birth order was 3 or more than 3 .The percentage of low birth weight baby was

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high among primipara mothers followed by grand multi-para mothers. Whereas least percentage was seen among multipara mothers. Thus there was statistically significant association between parity of mother and birth weight of newborn baby.[4] Agarwal et al, Kaushal et al, Som et al, Das et al, Deshmukh et al found similar findings in their study, while Mumbare et al, Deshpande et al, Dasgupta et al did not find any association between parity and birth weight of baby. [7-10, 11, 15] A study conducted at a rural project hospital in Haryana by Makhija et al[16] revealed that parity and antenatal care had significant association with LBW.

Majority of low birth weight babies got delivered from mothers from birth interval was less than 2 years and association between birth interval and weight of babies was found to be significant

It was found that as the interval between previous and index pregnancy increased there was favorable effect on the birth weight of the baby delivered in index pregnancy[4] Deshpande et al, Das et al found statistically significant association between low inter pregnancy interval and low birth weight, while Agarwal et al, Deshmukh et al found no significant association between inter pregnancy interval and birth weight. [11, 14, 7, 17] Majority of babies were delivered from mothers having low hemoglobin status (less than 11 gm %) . association between birth weight and hemoglobin status was found to be insignificant.It was found that mothers who had anemia were more prone to deliver a low birth weight baby[4] Agarwal et al, Mumbare et al, Dasgupta et al, Deshmukh et al, found statistically significant association between anemia and low birth weight. [7,10,15,17] This finding is similar to the finding of study done by Mumbare et al. [10]

Majority have mothers have gone through 3 or more than three anti natal checkups. No significant association has been found between numbers of required visits as ANC and birth weight of babies.The percentage of low birth weight was highest (57.50%) among mothers who

did not receive any ante natal care and it decreased to 10.61% when visits were increased to 3 or more. A significant relationship was found between number of ANC visits and birth weight.[4] Das et al also found significant association between ante natal care and birth weight, while Kamaldoss did not find any association. [15, 18] it was found that maternal age, marital status, caste, parity, smoking and consumption of alcohol during pregnancy, middle and lower socioeconomic status, twin pregnancy, h/o previous low birth weight, antenatal check-up, maternal BMI, mode of present delivery, and paternal occupation were significantly associated with low birth weight.[5]

Conclusion:

It is thus concluded that though the problem of LBW is multi factorial, yet it is probable that maternal weight (reflecting acute under nutrition) and birth interval are strongly associated and mother's age, anaemia, height(reflecting chronic malnutrition) and visit to health centre are weekly associated with it.

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