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THE RELATIONSHIP OF BIRTH WEIGHT WITH OCCIPITOFRONTAL CIRCUMFERENCE AND MID UPPER ARM CIRCUMFERENCE: AN ALTERNATIVE MEANS TO DETECT LBW

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ABSTRACT:

Objective: To evaluate the usefulness and reliability of Occipitofrontal Circumference (OFC) and Mid Upper Arm Circumference (MUAC) as proxies to predict LBW when and where an infant weight machine is not available or measuring troublesome or may give wrong value. This will provide base-line data for local population and employ for further study to identify LBW by using these two parameters – OFC and MUAC.

Methods: This is a cross-sectional observational study; conducted on 325 live births delivered during the period June 2013 to December 2013 at the 1st Affiliated Hospital of Zhengzhou University, Zhengzhou, Henan, P.R. China. The baby is born either through vaginal route or by lower (uterine) segment Caesarean section (LUCS). Infants with gross congenital anomalies, toxemic mothers and who were not the first babies in the family were not included in the study. Birth weight, OFC and MUAC were taken within 24 hours of birth using standard technique. The data obtained was subjected to a computer based analysis and statistical analysis was drawn using the SPSS version 17.0.

Results: There were 179 males and 146 female infants. The birth weight of all newborns ranged from 1750 gm to 4050 gm with an average of 2952.3 gm. Birth weights of male infants ranged from 1750 gm to 3850 gm with an average of 2959.6 gm. Similarly, birth weights of female infants ranged from 1950 gm to 4050 gm with an average of 2939.78 gm. The incidence of LBW in the study was 9.54% (n= 31).

Conclusion: OFC of all neonates ranged from 30cm to 38.8 cm with an average of 33.83 cm. The OFC of male neonates ranged from 30 cm to 38.8 cm with an average of 33.95 cm. Similarly, the OFC of female neonates ranged from 31.2cm to 36.8 cm with an average of 33.71cm. MUAC of all neonates ranged from 6.8 cm to 11.8 cm with an average of 9.27 cm. The MUAC of male neonates ranged from 6.8 cm to 11.4 cm with an average of 9.34 cm. Similarly, the MUAC of female neonates ranged from 7.2 cm to 11.8 cm with an average of 9.18 cm.

Keywords: LBW, Occipitofrontal circumference, Mid-upper arm circumference.

INTRODUCTION:

About four million neonatal deaths occur worldwide every year, out of which 98% occur in developing countries. The majority among these newborn dies at home while they are taking cared by unskilled persons; like the mothers, relatives or the traditional birth attendants.[1] At the early twenty centuries, all small newborns were regarded as premature. About 50 years later, the concept of malnourished or undernourished children arises.

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Throughout the world about 16.7% of all newborns, as an estimated number 18 million babies.[3] are low birth weight and this the single most important underlying risk factors for deaths of the new born.[1,2] Intrauterine growths and development is one of the most important and valuable process in human life cycle. Any deviation from this may cause great influence in the later part of life. In the developing countries, it is the birth weight, which has been used invariably to access intrauterine growth. With the advent of time, new teachings and methods are being introduced, but weight is still an indicator of child survival. Birth weight is one of the most sensitive and reliable predictors of health of any community.[4] Low birth weight babies who remain alive, may suffer physical and mental impairments. The newborn with a low weight have the risk of almost 40 times as compare with normal birth weight infant, to face moderate to severe life-threatening problems. Half of the neonatal deaths occur among the infants whose birth weight is 1500 gm or less.[5] The purpose of this study was to assess the current status of LBW among the people of Zhengzhou, biggest city of Henan Province, China and the relevance of specific factors such as maternal medical history, pregnancy co-morbidities and complications, and the method of delivery to the final outcome.

2 Objectives

- To explore the correlations of OFC and MUAC with birth weights, so it can be used in the population to identify LBW babies.
- To find out an average / mean birth weight with standard deviation of OFC and MUAC.
- To detect the occurrence of LBW at the hospital and the possible risk factors associated with LBW newborns.

MATERIALS AND METHODS:

3.1 Study Design, Target Population and Sample Population

Study design was descriptive cross-sectional study. Mothers with pregnancy of the 1st Affiliated Hospital of Zhengzhou University was the target population and the sample population was the mothers who admitted into the 1st Affiliated Hospital of Zhengzhou University and delivered a live-baby from June 2013 to December 2013.

3.2 Inclusion and Exclusion Criteria, Consent

Inclusion Criteria: Primigravida. Term neonates born of vaginal delivery or by cesarean section were included. Term neonates include those born after 37 completed weeks of gestation but before 42 completed weeks. Gestational age was calculated from the first day of last menstrual period of the mother.

Exclusion Criteria:

1. Pre-term babies.
2. Post-term babies.
3. Multigravida
4. Multiple births

5. Babies whose gestational age could not be determined
6. Neonates with gross congenital anomalies
7. Babies whose parents did not give consent

Consent: Before including the neonates in the study, the parents were explained the purpose of the study and taking the measurements of the neonates. Once the verbal consent was obtained with the presence of a Nurse especially trained in Neonatal care, a written form has given both in English and Chinese language to get the written informed consents.

3.3 Data Collection Tools

Questionnaire, hospital record books. Once the consent was taken, the detailed obstetric history was obtained from mother and father (if present). Information gathered were: IP no., Mother's name, age, address, date and time of delivery, 1st day of LMP, gravid, parity, maternal education, maternal profession, maternal consumption of alcohol and tobacco, maternal supplementation of folic acid, iron and calcium and use of other medications, use of contraception and type of contraceptives, mode of delivery and sex of the baby. The gestational age of the baby was calculated from the first day of LMP which was again verified in admission chart. Then hands were washed with soap and water before examining the neonates. Measuring tape was wiped with spirit swab before and after taking the measurements.

Mid Upper Arm Circumference Measurements: Mid upper arm circumference is measured at a point halfway down the left arm between tip of accromion and olecranon process to the nearest 0.1 cm.

Head Circumference Measurements: The head circumference in the largest dimension around the head (the occipito-frontal circumference) was obtained with a tape placed securely above the ears. The tape is placed over the mid forehead and is extended circumferentially to include the most prominent portion of the occiput so that the greatest volume of the cranium is measured. The measurement is taken to the nearest 0.1 cm. Both measurements were made with a fiber tape which was standardized daily before measuring the baby with a standard steel tape (G.W. 309 Made in China). Weighing of all neonates was done within 24 hours of birth by an electronic weighing scale, which had sensitivity of up to 10 grams. Weighing scale was standardized daily using a known standard weight. The same weighing machine was used to weight all neonates for the whole study period. A different clean piece of cloth was kept on the base of the weighing machine for each infant to prevent hypothermia and transmission of infections. The cloth's weight was deducted from the weight of the baby so that accurate weight of the baby was obtained. All these anthropometric measurements were taken within 24 hours of birth.

3.4 Ethical Considerations

According to WHO guidelines of ethical consideration, following steps were followed:

a) All the interviews were conducted with prior consent of the respondents.
b) Respondents were told that the data collected from the interview would be kept confidential and would be used for the study purpose only.
c) No incentive was given to the respondents.

3.5 Statistical Analysis

After completion of data collection, the obtained data were checked, verified and coded and data with inconsistencies were discarded. All data coming from the study area had been kept with strict confidentiality. The data input was given to SPSS-17 and analysis was done by the same software. Frequencies and percentages were calculated and chi-square test was performed to find out the bivariate relationship between different variables. Correlation was considered significant when the observed significant level was less than p value of 0.05.

4 Results and Observations

In this study 325 full term newborns that were born at the Obstetric Unit, Department of Gynecology and Obstetrics, 1st Affiliated Hospital of Zhengzhou University and kept in general ward during the study period were enrolled. There were 179 (55.08%) male and 146 (44.92%) female infants. The birth weight of all newborns ranged from 1750 grams to 4050 grams with an average of 2952.3 grams. Birth weight of male newborns ranged from 1750 grams to 3850 grams with an average of 2959.6 grams. The same way, birth weight of female newborns ranged from 1950 grams to 4050 grams with an average of 2939.78 grams. The birth weight of low birth weight newborns ranged from 1750 grams to 2400grams with an average of 2210.87 grams. The incidence of low birth weight in the study was 9.54% (n=31).

Relationship between OFC and LBW

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval	
	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower
Equal Variance Assumed	.202	.654	12.479	323	.000	1.98292	.15889	1.67032	2.29551
Equal Variance not Assumed			13.722	38.46	.000	1.98292	.14451	1.69049	2.27534

In this table, SPSS had done the Levene's Test. The test is done to see the hypothesis. Whether there is any relationship between LBW and OFC. Here the table shows that, the P-value of the Levene's test is 0.000, which is less than 0.05. So, in 95 % confidence interval we can accept the null hypothesis. It means that the relationship between LBW and OFC is highly significant.

Relationship between OFC and MUAC

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval	
	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower
Equal Variance Assumed	7.275	.007	8.924	323	.000	1.05396	.11810	.82162	1.28631
Equal Variance not Assumed			12.558	46.52	.000	1.05396	.08393	.88507	1.22285

In this table, SPSS had done the Levene's Test. The test is done to see the hypothesis. Whether there is any relationship between LBW and MUAC. Here the table shows that, the P-value of the Levene's test is 0.000, which is less than 0.05. So, in 95 % confidence interval we can accept the null hypothesis. It means that there is a strong relationship between LBW and MUAC.

Mean Value of OFC and MUAC

	Birth weight	N	Mean	Standard Deviation	Std. Error Mean
OFC length in cm	2500-3999	294	34.0378	.84972	.04956
	<2500	31	32.0548	.75579	.13574
MUAC length in cm	2500-3999	294	9.3830	.64288	.03749
	<2500	31	8.3290	.41809	.07509

In this table, we can find out that, in case of normal birth weight sample, the mean and standard deviation of OFC are 34.0378 and 0.84972 respectively. And, in case of Low birth weight sample, the mean and standard deviation of OFC are 32.0548 and 0.75579 respectively.

Similarly, we can also find out that, in case of normal birth weight sample, the mean and standard deviation of MUAC

are 9.3830 and 0.64288 respectively. And, in case of Low birth weight sample, the mean and standard deviation of MUAC are 8.3290 and 0.41809 respectively.

LBW IN RELATION TO MATERNAL AGE

Maternal age is an important factor to predict the birth outcome of a neonate. Mothers who are teenage or elderly, have the risk of increasing incidence of low birth weight neonates.

Table no. 1: Distribution of LBW in relation to maternal age

Maternal age	Total newborns		Number of normal weight babies	Total LBW babies	
	Number	Percentage		Number	Percentage
<20 yrs	20	(6.15%)	15	4	(20%)
20—29	253	(77.85%)	228	23	(9.09%)
30—39	49	(15.08%)	43	4	(8.16%)
>40	3	(0.92%)	3	0	

Maternal age in the present study ranged from 18 years to 46 years with a mean age of 26.4 years. More than two third (77.85%) of the mothers were in age group 20 to 30 years. Less number of mothers (6.15%) were below 20 years and a very few (0.92%) were above 40 years. It is clear from the table that mothers younger than 20 years had the highest incidence (20.0%) of low birth weight.

LBW IN RELATION TO PARENTAL CONTRACEPTION

An attempt was made to find out the correlation between neonatal birth weight and parental use of family planning measures.

Table no. 2: Distribution of LBW in relation to parental contraception

Parental Contraception	Total newborns		Number of normal weight babies	Total LBW babies	
	Number	Percentage		Number	Percentage
Users	283	87.08%	252	26	9.18%
Non-Users	42	12.92%	37	5	11.90%

In the study, a huge number of parents are using family planning methods. The most common method was found the barrier method. The incidence of low birth weight among the contraceptive non-users was more (11.90%) but because of a small sample size, no definite conclusion could be drawn.

LBW IN RELATION TO MATERNAL PROFESSION

As it is always seen, the nature and type of maternal work has an effect on the baby's birth weight.

Table no. 3: Distribution of LBW in relation to maternal profession

Maternal Profession	Total newborns		Number of normal weight babies	Total LBW babies	
	Number	Percentage		Number	Percentage
Service	97	29.85%	90	7	7.21%
Business	119	36.62%	106	13	10.92%
Labor	58	17.85%	49	9	15.51%
Housewife	24	7.38%	23	1	4.17%
Others	27	8.30%	26	1	3.70%

In the above table, 'Service' means job in the Private sectors, in the schools or others government sectors; while 'Others' means mothers, who are involved in social welfare activities or politics. In the study, majority of the mothers were involved in business (36.62%) followed by services (29.85%). The highest incidences of low birth weight were among the mothers who were labors. The lowest incidences were seen among service holder mothers; though housewife and others had the lowest occurrences of low birth weight according to the table, but the sample size is poor.

LBW IN RELATION TO MATERNAL EDUCATION

Maternal education influence socio-economic level and affect health related parameters and may have a direct or indirect effect regarding the birth weight of the neonate.

Table no. 4: Distribution of LBW in relation to maternal education

Maternal Education	Total newborns		Number of normal weight babies	Total LBW babies	
	Number	Percentage		Number	Percentage
Primary	38	11.69%	31	7	18.42%
High School	173	53.23%	158	15	8.67%
Graduate or above	114	35.08%	105	9	7.89%

In the study, maximum number of mothers (53.23%) had high school level (from 7th grade to 9th grade) and many of the mothers (35.08%) had graduate or higher education. The incidence of LBW among these groups are > 50% less in comparison with mothers had primary education, may be because of the association of socio-economic status together with the education level.

LBW IN RELATION TO MATERNAL SMOKING

Table no. 5: Distribution of LBW in relation to maternal smoking

Maternal Smoking	Total newborns		Number of normal weight babies	Total LBW babies	
	Number	Percentage		Number	Percentage
Smokers	47	14.46%	42	5	10.64%
Non Smokers	278	85.54%	252	26	9.35%

LBW IN RELATION TO MATERNAL ALCOHOL

Table no. 6: Distribution of LBW in relation to maternal alcohol

Maternal Alcohol	Total newborns		Number of normal weight babies	Total LBW babies	
	Number	Percentage		Number	Percentage
Alcoholic	27	8.31%	23	4	14.81%
Non Alcoholic	298	91.69%	266	27	9.06%

LBW IN RELATION TO MATERNAL ANTENATAL CHECKUP

Table no. 7: Distribution of LBW in relation to maternal antenatal checkup

Maternal ANC	Total newborns		Number of normal weight babies	Total LBW babies	
	Number	Percentage		Number	Percentage
Less than 3	89	27.38%	75	13	14.61%
3 or more	236	72.62%	214	18	7.63%

LBW IN RELATION TO MATERNAL NUTRITIONAL SUPPLIMENTATION

Table no. 8: Distribution of LBW in relation to maternal nutritional supplementation

Maternal Nutritional Supplementation	Total newborns		Number of normal weight babies	Total LBW babies	
	Number	Percentage		Number	Percentage
Taken	274	84.31%	246	24	8.76%
Not taken	51	15.69%	43	7	13.73%

LBW IN RELATION TO GENDER OF THE NEONATE

Table no. 9: Distribution of LBW in relation to gender of the neonate

Gender of Neonates	Total newborns		Number of normal weight babies	Total LBW babies	
	Number	Percentage		Number	Percentage
Male	179	55.08%	164	15	8.38%
Female	146	44.92%	130	16	10.96%

LBW IN RELATION TO MODE OF DELIVERY

Table no. 10: Distribution of LBW in relation to mode of delivery

Mode of Delivery	Total newborns		Number of normal weight babies	Total LBW babies	
	Number	Percentage		Number	Percentage
NVD	293	90.15%	267	26	8.87%
LUCS	32	9.85%	27	5	15.62%

LBW IN RELATION TO MATERNAL RESIDENCE

Table no. 11: Distribution of LBW in relation to maternal residence

Maternal Residence	Total newborns		Number of normal weight babies	Total LBW babies	
	Number	Percentage		Number	Percentage
Urban	218	67.08%	203	15	6.88%
Rural	107	32.92%	91	16	14.95%

LBW IN RELATION TO FAMILIAL ECONOMIC STATUS

Table no. 12: Distribution of LBW in relation to familial economic status

Familial Economic status	Total newborns		Number of normal weight babies	Total LBW babies	
	Number	Percentage		Number	Percentage
Low	72	22.15%	61	11	15.28%
Middle	149	45.85%	137	12	8.05%
High	104	32.00%	96	8	7.69%

LBW IN RELATION TO MATERNAL OBSTETRIC HISTORY

Table no. 13: Distribution of LBW in relation to maternal bad obstetric history

Maternal Bad Obstetric History	Total newborns		Number of normal weight babies	Total LBW babies	
	Number	Percentage		Number	Percentage
Present	28	8.62%	23	5	17.85%
Absent	297	91.38%	271	26	8.75%

Here, bad obstetric history includes Gestational Hypertension, Diabetes Mellitus and Eclampsia. As we know, it has a negative impact on fetal health, also we can see in our study, a considerable number (17.85 %) of mothers deliver LBW babies.

DISCUSSION:

According to guidelines published by the World Health Organization (WHO), any neonate with a birth weight below 2500 grams is considered to have LBW. LBW and PTM are leading causes of adverse perinatal outcomes and are closely related to neonatal diseases and deaths. In addition, when LBW infants enter adulthood, they are substantially more likely to suffer from hypertension, diabetes, and other metabolic diseases than individuals of normal birth weight; therefore, increasing the burden on their families and the community [6,7]. Because birth weight can be predictive of the child's health throughout life, it merits special attention. Throughout the world, there are more than 20 million LBW infants born each year, and 95.6% are born in developing countries. In 2000, the average incidence of LBW in developing countries was 16.5%, which is twice as high as in developed countries [8]. Data collected during the past decade have shown that nearly half of all LBW births throughout the world occur in developing countries in Southern Asia. The incidence of LBW in India is as high as 19.3% [9]. Because the incidence of LBW had been increasing, in 2012, the WHO proposed the goal of achieving a 30% reduction of the number of LBW infants by 2025 [10]. Similarly, the U.S. Department of Health and Human Services has made a goal of reducing the incidence of LBW to 5% [11].

Present study includes 325 full term singleton live birth neonates born by vaginal delivery or by caesarean sections between June 2013 to September 2013 at the 1st Affiliated Hospital of Zhengzhou University, Henan, China. There were 179 (55.08%) male and 146 (44.92%) female infants; and the male female ratio being 1.23:1. The birth

weight of all full-term newborns ranged from 1750 grams to 4050 grams with an average of 2952.3 grams. The incidence of low birth weight among full term newborns in the present study was 9.54% (n=31 out of 325).

Maternal age in the study ranged from 18 years to 46 years and the mean age was 26.4years. Number of teenager (below 20 years of age) mothers was 6.15%. The results of the present study showed the maternal age, both ≤20 years and >40 years, to be a risk factor for LBW. When pregnant women are too young, risk factors include incomplete development of organs and tissues, unmarried status, low level of education, poor financial conditions, and low body weight, which can lead to notable increases in the incidence of LBW. Some studies have shown that among pregnant teenagers 10–19 years of age, the incidence of LBW was significantly higher than among adult pregnant women [12,13]. Among 20,560 LBW mothers in New York City, pregnant teenagers accounted for 8.4%, and each LBW cost an average of 51,600 U.S. dollars. Considerable attention should be paid to pregnancy among teenagers [14, 15, 16]. However, as women age, different bodily functions gradually become less efficient, and the risks of chronic conditions and of pregnancy complications increase. Many studies have shown that the incidence of perinatal complications among pregnant women of advanced age is significantly higher than among younger women [17]. These complications can increase the incidence of LBW. There were 179 (55.08%) male and 146 (44.92%) female newborns. Among them 55.08% male and 44.92% female newborns were low birth weight.

In the study 14.46% (n=47) mothers admitted that they consumed tobacco. There is strong evidence that nicotine consumption during pregnancy causes low birth weight. The majority of studies carried out in counties other than China have shown that smoking and drinking lead to increases in the incidence of LBW [12, 16]. However, the present study showed no correlation between smoking or drinking and LBW. This may be related to the fact that far fewer Chinese women than western women smoke and drink alcohol. In my study, very few mothers (8.31%; n=27) accepted that they consumed alcohol during pregnancy. The quality and quantity of alcohol consumed by mothers was not recorded in our study. There was reverse correlation in the prevalence of LBW babies in mothers who did not consume alcohol during pregnancy and those who did (14.81% vs 9.06%). Due to large difference in sample size between the two groups, no calculation can be drawn. It is well established fact that alcohol causes a lot of problem in newborn, like low birth weight and fetal alcohol syndrome.

In the present study about 87.08% (n=283) of mothers were contraceptive users and 12.92% (n=42) did not use any means of contraception. The incidence of low birth weight among non-

contraceptive mothers was little higher (11.90%; and among contraceptive mothers was 9.18%) but it is difficult to draw any conclusion. Condom was found to be the most popular followed by oral contraceptive pills.

Majority of the mothers were involved in business (36.60%) followed by service holders (29.85%). Most incidences of low birth weight newborns were with laborers and businessmen 15.52% and 10.92% respectively. Other professions were relatively at lower risk of having low birth weight babies. In the study, maximum number of mothers (53.23%) had High school (from grade 7th to grade 9th) level of education followed by graduate or advance level of education (35.08%). About one tenth of the mothers having primary level of education, and among this group the incidences of low birth weight were more than twice as high as compare to others groups. The maternal level of education was found to be significantly closely correlated with the occurrence of LBW. The lower the level of maternal education, the higher the incidence of LBW. Because of the continuing socio-cultural development and the enforcement of compulsory education in China, pregnant women with low levels of education are mostly located in remote, economically underdeveloped regions. They tend to be uninformed regarding pregnancy nutrition and health care, and local levels of health care also tend to be poor, preventing them from undergoing regular checkups during pregnancy, which results in an increase in the incidence of LBW.

The consciousness about pregnant mother's health in China is rising dramatically over the past couple of years. Both the husband and wife are giving extreme importance and because of China's 'One Child Policy', they use every possible means to maintain pregnant mother's health in a good condition and thereby, a healthy baby. In the study, about one third (72.62%) of the mothers attended for three or more antenatal checkups. While the rest one third, mainly poor, rural and low level of education, failed to attend or attend less than three times in their whole pregnant period. The incidence of low birth weight babies among the latter group was almost double than the former group.

In the present study, the incidence of LBW among mothers having normal vaginal delivery was almost half (8.87%) compare to that of mothers undergoing cesarean section delivery (15.62%). In recent years, the proportion of childbirths involving cesarean sections has increased considerably worldwide, and it is significantly higher in China than in western countries. LBW is an important indicator for the need of a cesarean section. The results of the present study show the rate of cesarean section among LBW infants to be significantly higher than among neonates with normal birth weights. Of the cesarean sections, emergent cesarean sections are significantly more common among full-term LWB neonates than full-

term normal-weight neonates. Among full-term LBW neonates, the rate of cesarean sections due to fetal distress in utero and placental abruption secondary to limited fetal growth, other complications, or inability of the fetus to tolerate a vaginal delivery is relatively high. As reported by Coutinho, the rate of cesarean sections among LBW infants was 2.4 times that infants of normal birth weight, and the rate of converting to cesarean section during delivery among LBW infants was 1.5 times that of infants of normal birth weight [18]. The present study analyzed the correlation between different delivery methods among full-term LBW infants and their prognoses. The incidences of stillbirths, neonatal complications and neonatal deaths among LBW infants delivered by cesarean section were lower than those delivered vaginally. This is consistent with results reported by Coutinho, who found cesarean sections to be safer for LBW neonates than vaginal birth [19].

CONCLUSION:

I. Average birth weight of full term newborns was 2952.3 grams. The mean birth weight of male infants is comparatively greater than the female infants.
II. Incidence of low birth weight in this study was 9.45 %. And the prevalence of LBW among the female children are higher than the male children.
III. Mean age of mother was 26.4 years with a significant number of mothers (77.85%) were in between 20 and 30 years.
IV. The mean mid upper arm circumference of the study population was 9.27 cm. Similarly, average mid upper arm circumferences of male and female infants were 9.34 cm and 9.18 cm respectively.
V. The mean occipito-frontal circumference of all the neonates were 33.83 cm. Similarly, the mean occipito-frontal circumferences of male and female infants were 33.95 cm and 33.71 cm respectively.
VI. Relation is found significantly between low birth weight and maternal smoking, alcohol consuming, mode of delivery and bad obstetric history, low level of maternal education, poor socioeconomic condition and among the young aged mothers.

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