

A Study of Correlation of Child Birth Weight with Maternal Body Mass Index

Correlation
of CBW with
MBMI

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ABSTRACT

Objective: The objective of this study was to determine correlation of child birth weight with maternal body mass index (BMI).

Study Design: Cross sectional study

Place and Duration of Study: This study was conducted at Department of Obstetrics and Gynaecology Lady Aitchison Hospital Lahore and was completed in 14 months.

Materials and Methods: Data was collected using random sampling from 1000 females during post partum period. All pregnant females aged 18-35 years were taken and babies with intra uterine growth retardation (IUGR) were excluded. Data was managed in SPSS and was analyzed using same software.

Results: In this study, the average maternal weight, height and BMI were 63.50 ± 9.47 Kg, 154.10 ± 4.85 cm and 26.77 ± 4.03 respectively. The mean babies' weight on delivery was 2.83 ± 0.56 kg. There was significant positive correlation of fetal weight with maternal weight ($r=0.072$, p -value = 0.027) and maternal BMI ($r=0.086$, p -value = 0.007). This correlation was stronger in females who had normal vaginal delivery.

Conclusion: Birth weight has a significantly positive correlation with maternal weight and BMI. Being modifiable risk factors, controlling these may considerable reduce the risk of low birth weight and associated complications for both mother and newborn.

Key Words: Pregnancy, birth Wight, Maternal Weight, BMI

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INTRODUCTION

Low birth weight (LBW) has been defined by the World Health Organization (WHO) as weight at birth of less than 2500 g. LBW be the outcome of either preterm birth (before 37 weeks of gestation) or retarded fetal (intrauterine) growth. In 1976, the 23rd World Health Assembly agreed on the following definition; Low birth weight (LBW) is a weight at birth of <2,500 gm (upto and including 2,499 g), irrespective of gestational age.¹

Low birth weight is a very common, however potentially preventable problem particularly in developing countries. It has significant contribution in neonatal morbidity and mortality.² It is responsible of 60% of neonatal deaths during first year of their life and carries 40 folds higher risk of death for neonates in first month of their life.³ Also it impacts infant health with various complications during later stages of life. Birth weight can also indicate maternal health and nutritional status before as well as during the pregnancy.⁴ These complications include compromised cognitive and overall growth of child and increased risk of cardiovascular and metabolic diseases in adulthood.⁵

Remarkable geographical differences have been reported in prevalence of low birth weight around the globe particularly in Asia. The highest percentage of low birth weight has been reported in South Asia and lowest prevalence in East Asia. In East Asia, Thailand has the highest percentage of 36% while the rest of the countries have 5-10% prevalence of low birth weight. However, South Asia has alarmingly high prevalence of as much as 50%. Almost 25% of neonates births in Pakistan are classified as Low Birth Weight (LBW).⁴ A number of risk factors, both maternal as well as fetal, contribute to development of low birth weight. Maternal risk factors are major, and are influenced by both social and biological factors. Where some non-modifiable maternal factors like parity, maternal age and birth order are considerable factor, most modifiable factors like malnutrition, antenatal visits, daily iron supplement intake and BMI are also significant contributors of the disease. One Pakistani study showed that maternal BMI<19 taken as malnutrition, low socio-economic status and low education were all significantly associated risk factors with Low Birth Weight (LBW).⁶ Another Pakistani study, from Hyderabad Sindh showed that maternal biological and social factors such as teenage, illiteracy, lower social class and malnutrition taken as BMI<19 had significant association with low birth weight.⁷ Similarly, pre-pregnancy body weight and during pregnancy weight of mother contributes significantly on birth weight on

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neonates.⁸ It is therefore mandatory to take account of such factors to be able to assess their role, control them and improve fetomaternal health outcomes. So this study was designed to determine correlation of child birth weight with maternal weight and BMI

MATERIALS AND METHODS

This Cross sectional study was conducted at department of Obstetrics and Gynaecology Lady Aitchison Hospital Lahore and was completed in 14 months.

Sampling: Simple random sampling was used to collect the data

Sample size: A total of 1000 females in their post partum period were taken and their baby's weight was also measured at time of birth.

Sample Selection Criteria: All pregnant females aged 18-35 years were taken with live birth and no congenital anomalies

Exclusion Criteria: Babies with intra uterine growth retardation (IUGR) were excluded

Data Collection Method: This study was conducted at department of Obstetrics and Gynaecology Lady Aitchison Hospital Lahore. Data was collected using random sampling from 1000 females after birth. All pregnant females aged 18-33 years during their in their post partum period were taken. Data was managed in

SPSS and was analyzed using same software. All data was entered and analyzed using SPSS version 22. Qualitative data like frequency of maternal body mass index and babies low birth weight was used. Mean \pm S.D, median, mode and other relevant statistics were calculated for maternal age, weight, height and BMI. Pearson correlation was used to measure strength of relationship between maternal weight, BMI and baby's birth weight.

RESULTS

In this study, the average maternal weight, height and BMI were 63.50 ± 9.47 Kg, 154.10 ± 4.85 cm and 26.77 ± 4.03 respectively. According to their BMI classification, 2(0.20%) females were under weight, 346(34.6%) had normal weight, 409(40.9%) were overweight and rest of 228(22.8%) were obese. The mean babies' weight on delivery was 2.83 ± 0.583 kg with prevalence of very LBW = 18(1.8%) and LBW were 175(17.5%). There was significant positive correlation of fetal weight with maternal weight ($r=0.072$, $p\text{-value} = 0.024$) and maternal BMI ($r=0.086$, $p\text{-value} = 0.007$). This correlation was stronger in females who had normal vaginal delivery. Moreover there was association between maternal BMI and Mode of delivery, $p\text{-value} = 0.03$.

Table No.1: Descriptive Statistics of Maternal weight, height, BMI and Fetal weight

	Maternal age (years)	Maternal Weight (kg)	Maternal Height (cm)	Maternal BMI	Fetal weight (kg)
Mean	26.76	63.50	154.10	26.77	2.830
Median	26	63	154	26.45	2.900
Mode	22	60	154	29.52	3.00
Std. Deviation	1.78	9.47	4.85	4.03	0.583
Minimum	18	33	126	14.57	1.00
Maximum	35	90	170	37.95	5.00

Table No.2: Correlation between fetal weight with maternal weight and BMI

		C-Section		Normal Delivery		Overall	
		Maternal Weight	Maternal BMI	Maternal Weight	Maternal BMI	Maternal Weight	Maternal BMI
Fetal Weight	Correlation	-0.032	-0.013	0.136**	0.143**	0.072	0.086
	p-value	0.580	0.820	0.000	0.000	0.024	0.007
	N	294	294	691	691	985	985

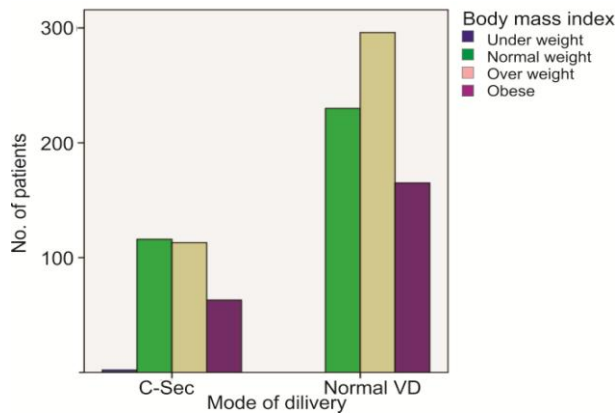


Figure No.1: comparison of birth weight with mode of deliver

DISCUSSION

Low birth weight remains to be a major public health issue causing neonatal deaths as well as serious morbidities. Furthermore, it results in long term poor health outcomes in low birth weighted infants in later stages of life. These problems include to diabetes, coronary heart disease, immune dysfunction and impaired cognitive development.⁹ It is, hence important to address the factors associated with this problem; mostly being maternal. Maternal BMI is one of major maternal causes of low birth weight. A number of studies, both local and international have accused low BMI and/or maternal malnutrition to be a statistically significant risk factor for not only low birth weight but also of poor health outcomes of both mother and the infant.^{3, 10-12}

Therefore our objective to conduct this study was determining correlation of child birth weight with maternal weight and BMI. We found that average maternal weight, height and BMI were 63.40 ± 9.47 Kg, 154.10 ± 4.85 cm and 26.77 ± 4.03 respectively. According to their BMI classification, 2 (0.20%) females were under weight, 346 (35.13%) had normal weight, 409 (41.52%) were overweight and rest of 228 (23.15%) were obese. In study by Memon Y. only 1% of mothers having LBW babies were having body weight more than 55kg, quite contrarily to our mean age i.e. 63.5 kg. However, consistent to our results they showed a highly significant association between low BMI and low weight with low birth weight.⁷

Bhatti A. also showed a significantly higher proportion of low BMI (<18.5) in mothers of cases (babies with LBW) than controls.¹³ An Indian study showed significantly higher prevalence (80.96) of low birth weight in mothers having body weight of less than 40 kg. In our study too, there was significant positive correlation of fetal weight with maternal weight ($r=0.072$, p -value = 0.024) and maternal BMI ($r=0.086$, p -value = 0.007). These results reveal importance of maternal BMI on health of newborn. Also these results suggest that if modifiable maternal factors, especially mother's weight and BMI are controlled, the risk of low birth weight and hence, mortality and lifelong complications related to LBW can be minimized. Further in depth studies are suggested in this regard as well.

CONCLUSION

Birth weight has a significantly positive correlation with maternal weight and BMI. Being modifiable risk factors, controlling these may considerable reduce the risk of low birth weight and associated complications for both mother and newborn.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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