

Title Weight of human placenta and maternal and fetal parameters: An Observational study

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Abstract

The aim of the study is to determine variations of human placental weight in live singleton term births and study their relationship with maternal and fetal parameters. Subjects were mothers of live, singleton, full term neonates delivered at the Tertiary care hospital Pune, Western Maharashtra between June 2010 to June 2012.

To determine variations of placental weight, hundred fourteen healthy pregnant mothers without H/O blood pressure, diabetes and preeclampsia were prospectively observed in our tertiary care hospital during antenatal period until delivery and immediate post-partum period. Placental weight and birth weight of babies were measured by immediately after delivery by an electronic weighing scale. The mean of birth weight was 2726 gm. with a standard deviation (SD) of 323 gm. Placenta weight had a mean of 384.5 gm. (SD) of 81.6 gm.

Eighty seven percent of the mothers were between the age group of 20-30 years. Most of the mothers were primigravida (40%) or second gravida (35%) and in 25% cases 3rd or onwards. In 49.12% cases the placental weight was between 300-400 gm. in 15.78% cases >300 gm. and in 27.19% cases was between 400 to 500 gm. There is no statistical association between placental weight and maternal and fetal parameters, though there is numerical difference.

Key Words: Placenta, Maternal and Fetal parameters

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Introduction

The human placenta plays an important role in regulating fetal growth. Careful examination of placenta can provide knowledge about intrauterine environment before birth. The placenta is genetically and biologically part of the fetus. It has metabolic, endocrine, immunogenic functions and also forms a barrier for noxious substances. What affects the placenta is also likely to affect the baby. As birth weight varies from one community to another, so also placental weight¹.

Dombrowski, M.P and others had found that Placenta weights appear to be influenced by multiple maternal and fetal processes and have presented a standard weight Table for singleton placentas among live infants born between 23 and 27 completed weeks².

Feleke Y. And others in their studies had noted that Parity and maternal age had significant effects only on the birth weight of the neonates³.

Lao T.T. and others had found that the placental ratio (the placental weight to birth weight ratio) was not correlated to the haemoglobin levels at booking, third trimester. Placental ratio was also correlated to gestational age in all groups. The placental ratio is increased in anaemic pregnancies⁴.

Naeye R.L. in their studies had found that following factors were found to be associated with placental ratio with low placental weight low maternal pregravid body weight, low pregnancy weight gain, high maternal haemoglobin levels during pregnancy, gestational hypertension, paid employment outside the home during pregnancy, and low parity⁵.

Williams L.A. and other in their studies had found that the placental weight to birth weight ratio was significantly and positively associated with gestational age, female sex, Asian parentage, increasing maternal body mass index, increased maternal weight at booking, lower socioeconomic status, maternal anaemia, and increasing number of cigarettes smoked daily. There were no consistent relations between the placental weight to birth weight ratio and measures of newborn size⁶.

In present study is therefore, we try to assess the placental weight and its relationship to fetal parameters and maternal parameters if any in live single term births in western Maharashtra region of India.

Material and Methods

First of all clearance was obtained from the medical college ethical committee. Permission as well as cooperation was requested from the consultants and nursing staff of the obstetrics and gynaecology department of our tertiary care hospital. From June 2010 to June 2012, the placentas obtained randomly from singleton full term pregnancy (37 to 42 weeks of gestation) live birth neonates delivered at the maternity ward of hospital were collected and assessed. Excluded

from the study were placentas of mothers of post-term babies (>42 completed weeks), preterm babies (< 37 weeks), incomplete placentas and term babies with obvious congenital malformations and stigmata of chromosomal anomaly, babies of diabetic and hypertensive mother.

Each placenta was held by the cord under running water to wash off the blood and clots. Membranes were cut precisely at margin. Each complete placenta was weighed in grams by electronic weighing scale.

Maternal data like name and age, outpatient number, indoor patient number date of delivery with date of last menstrual period, parity, place of Antenatal care (ANC), number of clinic attendances, duration of pregnancy in weeks and the gestational age at the booking were recorded. Any maternal illness and time of illness during pregnancy, especially, anaemia, malaria, pregnancy induced hypertension, ante partum haemorrhage, diabetes mellitus, history of jaundice was noted and excluded from study. The socio-economic class of the parents was assessed based on occupation and educational levels attained by both parents. Maternal parameters such as weight of mother, weight of fetus, blood pressure of mother, blood group of mother haemoglobin of mother noted.

Total number of specimens- 114 human placenta.

Material

Dissecting instruments, vernier calliper, electronic weighing machine

Findings

Table 1: The Maternal age

Age of mothers (years)	N	%	Mean	Standard deviation
< 20	12	10.52	23.92	2.82
21 -25	74	64.91		
26- 30	25	21.92		
>30	3	2.63		

Table 1 shows that eighty seven percent of the mothers were between the age group of 20-30 years. Mean was 23.92 and SD 2.829.

Table 2: Weight of placenta

Weight of placenta (gms)	N	%	Mean	Standard deviation
< 250	3	2.63	384.5	81.36
251 -300	16	14		
301- 350	23	20.17		
351- 400	31	27.19		
401-450	18	15.78		
451-500	13	11.4		
>500	10	8.77		

Table 2 it is observed that in 49.12% cases the placental weight was between 300-400 gm, in 15.78% cases >300 gm and in 27.19% cases was between 400

to 500 gm. Range found was 235.6 to 620.7 with mean 384.5 and SD was 81.36.

Table 3: Weight of mother

Weight of Mother (kg)	N	%	Mean	Standard deviation
< 45	5	4.38	54.68	5.826
46- 50	21	18.42		
51- 55	43	37.71		
56- 60	30	26.31		
< 60	15	13.15		

In the Table 3 it is observed that in 64% cases the weight of mother is 50 to 60 kg at the time of admission. Range found was 43 to 71 kg with mean 54.68 and standard deviation was 5.826.

Table 4: Haemoglobin of mother

Hemoglobin of mother (gm %)	N	%	Mean	Standard deviation
< 9	3	2.63	10.75	1.006
9- 10	34	29.82		
10-11	50	43.85		
11- 12	18	15.78		
>12	9	7.89		

In the Table 4 it is observed that 69.6 % cases haemoglobin in mother was 10 to 12 gm% with range of 7.1 to 14 gm%. Mean found was 10.75 and SD was 1.

Table 5: Weight of Neonate

Weight of Neonate (gms)	N	%	Mean	Standard deviation
< 2500	26	22.80	2726	323
2501 -2750	45	39.47		
2751-3000	24	21.05		
>3000	19	16.66		

In Table 5 it is observed that there was delivery of appropriate-birth-weight babies (2500 to 3000 gms) in 77.19 % cases. The range found was 2100 to 4000 gm with mean 2726 and SD 323.

Table 6: Blood group of mother

Blood group of mother	N	%
A positive	26	22.80
B positive	18	15.78
O positive	60	52.63
AB positive	09	7.89
O negative	01	0.87

Table 7: Correlation between placental weight and fetal weight

Placental weight	Weight of Fetus		Total
	<2500	>2500	
<350	12	28	40
>350	18	56	74

$\chi^2 = 0.127$ with 1 df P = 0.721 NS

There is no statistical association between weight of fetus and placental weight, though there is numerical difference.

Table 8: Correlation between placental weight and maternal age

Placental weight	Maternal age			Total
	<20	21-25	25-30	
<350	6	27	10	43
>350	6	46	19	71

$\chi^2 = 1.400$ with 2 df P = 0.497 NS

There is no statistical association between maternal age and placental weight, though there is numerical difference.

Table 9: Correlation between placental weight and maternal haemoglobin

Placental weight	Maternal Hemoglobin					Total
	<9	9-10	10-11	11-12	>12	
<350	3	14	18	3	3	41
>350	1	20	31	15	6	73

$\chi^2 = 6.363$ with 3df P = 0.125

There is no statistical association between Maternal Haemoglobin and placental weight, though there is numerical difference.

Discussion / Conclusion

What affects the placenta is also likely to affect the baby. As birth weight varies from one community to another, so also placental weight. But in present study we don't find any statistical association between weight of placenta and fetal weight.

The placental ratio was not correlated to the haemoglobin levels at booking, third trimester in studies done by Fekele and others. But in our studies we also don't find any significant association between maternal haemoglobin level and placental weight. Though parity and maternal age had significant effects on the birth weight of the neonates as noted by Fekele.

Placental ratio was also correlated to gestational age in all groups. The placental ratio is increased in anaemic pregnancies and anaemia is the cause for an increased placental ratio as noted by Lao and others. But in our studies we don't find any statistical association between placental weight and maternal haemoglobin. The difference in findings of other studies and present study may be because of genetic and racial variations.

The following factors were found to be associated with low placental weight low maternal pregravid body weight, low pregnancy weight gain, high maternal haemoglobin levels during pregnancy, gestational hypertension, paid employment outside the home during pregnancy, and low parity as noted by Naeye and others. But in our studies we don't find any statistical association between placental weight and

maternal haemoglobin. There were no consistent relations between the placental weight to birth weight ratio and measures of newborn size as noted by Williams L.A and other co Authors. In present studies we also don't find any correlations between placental weight and fetal weight.

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