

# Variation of Placental and Neonatal Weight in Normal Pregnancy and Pregnancy with Hypertension in Western Maharashtra

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## ABSTRACT

*Placenta is an organ for foetal nutrition and continuation of pregnancy. Morphological changes are observed in hypertensive disorder of pregnancy. Weight of placenta affects neonatal weight, and the predisposing factor for this is maternal age.*

**Keywords:** Placenta, Maternal age, Birth weight, Pre-eclampsia, Eclampsia.

Access this article online	
Quick Response Code:	Website: www.innovativepublication.com
	DOI: 10.5958/2394-2126.2015.00003.1

## INTRODUCTION

**Placenta** arises *denovo* as an organ of vital importance for foetal nutrition and continuation of pregnancy. Ample of work has been done to understand the 'Unique biological status of this complex organ<sup>1</sup>. High clinical morbidity and mortality are accompanied by certain pathological changes in placenta<sup>2</sup>.

Pathological patterns like infraction, retro-placental haematoma, sub-chorionic fibrin are higher in pre-eclampsia and eclampsia pregnancy. Placental changes are directly proportional to the duration of the disease process and its severity. Morphologically placenta of pregnancy induced hypertension are more severely affected than placenta of essential hypertension. Foetal outcome is adversely influenced by pathological changes observed in placenta<sup>2</sup>. Certain studies have been carried out in this respect but still further investigations are to be carried out to ascertain the findings of previous studies.

## AIMS AND OBJECTIVES

- To identify morphological variations like weight of placenta, with neonatal weight and maternal age group.
- To study morphological changes in placenta of normal pregnancy and in pre-eclampsia and eclampsia associated with pregnancy.

## MATERIAL AND METHODS

- Total of 150 placentas were collected from obstetrics and gynaecological department, Dr. Vaishampayan Memorial Government Medical College Solapur, from April 2009 to December 2010.
- Study groups: includes 75 placentas from women with pre-eclampsic and eclampsic pregnancy
- Control groups: includes 75 placentas of women with normal full term pregnancy.
- The females included in the study group were of age 20-35 yrs.
- The placentae were then transported to laboratory, in large flat containers which contained 0.5% formaldehyde in saline so that placental shape could be retained. Fixative volume was sufficient to completely surround and immerse the placenta.

**Method of Examination and Sampling:** The umbilical cord, placental membranes, foetal and maternal surfaces, and villous tissue were carefully examined.

**Examination of the Placental Disc:** The disc weight was obtained after removing membranes, cord and extraneous clot. A major variable in placental weight is the amount of foetal blood present in the placenta. The foetal surface was inspected for colour and opacity. The vessels of chorionic surface were examined for thrombi and calcification. The maternal surface also was inspected for intactness and presence of hematomas and/or depressions<sup>6</sup>.

The cases were divided into two groups –

- Study Groups:** Placenta obtained from Hypertensive pregnant women i.e. (Pre-eclampsia and Eclampsia pregnancy)
- Control Groups:** Normal full term placenta.

Criteria laid down for each group are as follows:-

**Eclampsia** included cases with higher blood pressure over 200 mm of Hg systolic with proteinuria of > 5gms/ 24hrs, oedema and associated symptoms like headache, dizziness, disturbance of vision, epigastric pain and convulsions.

**Pre-eclampsia** included cases with sustained rise of blood pressure of 160 systolic or 110 diastolic or

more with proteinuria more than 1.0gm/l and marked oedema

**Control group:** from normal full term deliveries.

**Statistical analysis was done by using:** ‘Z’ test and ‘Tukey’ test to measure difference between two mean Calculated by SPSS version 18.



**Fig 22: Measuring instruments:** 1. Weighing machine with weights; 2. Measuring scale; 3. Measuring tape; 4. Scalpel with surgical blade; 5. Vernier calliper; 6. Forceps blunt; 7. Forceps toothed; 8. Gloves

**OBSERVATION AND RESULTS**

**Table 1: Showing Total Number of Placenta in Study and Control Group**

Groups	Total Number of Placenta
Eclampsia	4 (2.6%)
Pre eclampsia	71 (47.3%)
Normal	75 (50%)
<b>Total</b>	<b>150</b>

Table 1 shows the percentage wise distribution of 150 placentas

**Table 2: Showing Age-wise Distribution of Placenta**

Groups	Age 20-24	Age 25-30	Age31-35
Eclampsia	3	0	1
Pre –eclampsia	44	25	2
Normal	53	18	4
<b>Total</b>	<b>100</b>	<b>43</b>	<b>7</b>

Age group of 20-24yrs are predisposed to both pre-eclampsia and eclampsia.

**Table 3: Showing Weight-wise Distribution of Placenta Weight in gm**

Groups	<500	500	>500
Eclampsia	4 (100%)	00	00
Pre-eclampsia	67 (94.3%)	4 (5.6%)	00
Normal	54 (72%)	13 (17.3%)	8 (10.6%)
<b>Total</b>	<b>125</b>	<b>17</b>	<b>8</b>

Shows that the weight of placenta is less than 500gms in 100% eclampsia cases, whereas 94.3% pre-eclampsia cases and 72% of normal pregnancies.

**Table 4: Showing Average Neonatal Weight in the Three Groups Weight in grams**

Groups	Averages neonatal weight
Eclampsia	1900
Pre-eclampsia	2372.54
Normal	2742.33

Shows that neonatal weight decreases with pre-eclampsia and eclampsia being more than 2700gms in normal pregnancy and 1900 to 23750 gms in eclampsia and pre-eclampsia.

**Table 5: Weight of Placenta in Grams**

Groups	Control MEAN±SD	Pre-Eclampsia MEAN±SD
Mean placental Wt. In grams	N=75 456.8±50.914	N=71 414.47±63.18
Statistical test	Z- TEST.STANDARD SIGNIFICANT LEVEL IS P <0.05	P<0.03 SIGNIFICANT

There was significant variation in mean placental weight in pre-eclampsia accordingly, it is observed p<.0.05 that, there is decrease placental weight in above study.

**Table 6: Neonatal Weight in Grams**

Groups	Control	Pre-eclampsia
Mean Birth wt. of Neonates in grams	N=75 2742.33±339.53	N=71 2373.53±392.68
Statistical Test	Z -TEST STANDARD SIGNIFICANT LEVEL IS P <0.05	P<0.001 SIGNIFICANT

Table 6 shows that, the neonatal weight is significantly less in pre-eclampsia.

## DISCUSSION

The placenta has been described as the mirror of the prenatal mortality. A glance of the literature reveals that eclampsia, pre-eclampsia syndrome exerts its deleterious effect on the placenta. This study analysed and assessed the variations in weight of placenta with neonatal weight and maternal age and correlated it to the changes in normal pregnancy, eclampsia and pre-eclampsia. The 150 placenta studied included 75 placentae from uncomplicated full term deliveries, considered as a “control group” and 75 placentae from eclampsia and pre-eclampsia, considered as “study group”.

### 1. WEIGHT OF THE PLACENTA

Normal placental weight is 653gm on an average, and its water content is 84.15% (cibis luis<sup>7</sup>). **Mallik et al**<sup>5</sup>; has reported placental weight less than 300gm in five cases of toxemia. **Nobis and Das (1980)**<sup>1</sup> have shown in their study of toxemic cases that, placental weight varies from 279-407gms. **Arati et al**<sup>8</sup> has shown decrease in placental weight in severe toxemic cases.

In the present study, eclampsial placental weight was less than 500gms in 100% of cases and least weight was 350gm. 94.3% placentae from pre-eclampsia cases was less than 500gms, and it was further observed that least placental weight was 200gms. In present study 72% of normal pregnancy placental weight was less than 500gm and least weight was 300gms.

P-value of <0.02 was statistically significant in present study of mean placental weight( in gram) of eclampsia, 100% of placenta (4 placenta) cases show reduction of weight less than 500gms, whereas p-value of < 0.03 was significant in mean placental weight of pre-eclampsia, 94.3% of placenta (67 placenta) cases show reduction of weight less than 500gms.

**2. NEONATAL WEIGHT:** In present study it was observed that neonatal weight decreases with disease of pregnancy. In normal pregnancy, neonatal weight is more than 2500-2700gms but in eclampsia and pre-eclampsia case it is around 1900-2375gms. Neonatal weight from 4 eclampsic cases show average weight of 1900±812 and p-value<0.01 found significant. The 71 cases of pre-eclampsia studied showed that average neonatal weight, varied from 2373±392 and p-value<0.001 was found significant.

**Palaskar et al 2001**<sup>4</sup> mean birth weight, placental weight and foeto-placental ratio was less in diseases of pregnancy as compared to normal pregnancy.

**According to Rath in 1994**<sup>3</sup>, low birth weight of the babies due to altered intra-cotyledon vasculature arrangement in hypertensive pregnancy, and heavy proteinuria have increased the incidence of low birth weight babies in pre-eclampsia.

**Fox**<sup>9</sup> stated that reduction in neonatal weight due to decrease in the villous population, will interfere with foetal nutrition and growth. This may be a consequence of placental insufficiency, secondary to inadequate utero-placental blood flow.

The neonatal weight in eclampsia and pre-eclampsia with p-values less than 0.001 ( $p < 0.001$ ) is statistically highly significant in present study.

### SUMMARY AND CONCLUSIONS

1. A comparative morphological study of placenta of normal pregnancies and placenta of pre-eclampsia and eclampsia are carried out.
2. 75 placenta from normal full term deliveries were considered as "control group" and 75 placenta from pre-eclampsia and eclampsia were considered as "study group".
3. The weight of the placenta was less in pre-eclampsia and eclampsia as compared to placenta of normal pregnancy.
4. The neonatal birth weight was less as compared to the neonatal birth in normal pregnancy.

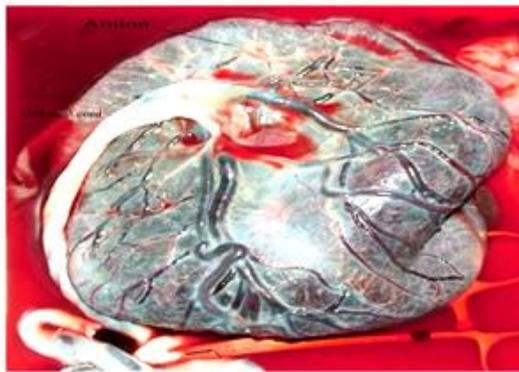


Fig. 1

### CONCLUSIONS

1. The morphometry of placental weight showed significantly lower values in the study group than the control normotensive group.
2. The study reveals that the placental weight and foetal weight are significantly less in hypertensive group than in the control group.
3. The present study showed that incidence of preeclampsia and eclampsia is more commonly seen in the age group of 20-24 years.

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