

## COMPARISON OF PLACENTAL WEIGHT IN PREGNANCIES WITH STILLBIRTH AND LIVE BIRTH CONTROLS.

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### **ABSTRACT**

**Introduction:** A foetus born after 20 weeks of gestation that shows no signs of life on direct observation or a zero Apgar score at 1 and 5 minutes defines stillbirth. It can be due to maternal, foetal, or placental causes. According to WHO, annually about 2 million stillbirths occurs Placenta being a multitalented organ alone fulfils the nutritive, respiratory, excretory functions during intrauterine life The ability of foetus to grow in uterus depends on the placental perfusion. Weight of placenta is a measure of its function. The ratio between weight of placenta and neonatal weight is 1:6. at term.

**Material and Methods:** This study was conducted on 100 pregnant women with stillbirth and on 100 pregnant women with live birth. The placentas were taken from the Department of Obstetrics and Gynecology, JNMC, and weighed.

**Results:** Median (25th-75th percentile) of placental weight(gm) in cases was 355(285.25-480) which was significantly lower as compared to controls [460(387.5-502.5)]. (p value <.0001; Odds ratio (95% CI): -0.994(0.991 to 0.997).

**Conclusion(s):** With the increase in placental weight, risk of still birth significantly decreases with adjusted odds ratio of 0. 993.Low Placental weight is a cause of still births.

**Key words:** Stillbirth, placental weight.

**INTRODUCTION-** Pregnancy- the blessed period in the life of a woman justifies the adage “Life begets Life” as it leads to the beginning of new life. This complex physiological process results from a critically planned relationship between Maternal-Foetal-Placental factors. Any pathogenic

factor that perturbs them can result in the deviation of pregnancy outcomes to an unfavourable one.<sup>1</sup> According to WHO, annually about 2 million stillbirths occurs.<sup>1</sup> In a multi-centre study, out of 552,547 births (500 g or 20 weeks' gestation), 15,604 were stillbirths<sup>2</sup> In an Indian study, the rate of stillbirth rate was 16/1000 birth.<sup>3</sup>

Placenta being a multitalented organ alone fulfils the nutritive, respiratory, excretory function during intrauterine life. Amongst the numerous causes of stillbirth, placenta is still the least explored one. Considering the indispensable, multifunctional role of placenta in pregnancy more research into this mysterious organ can help in prevention of stillbirth by unmasking the anatomical and histological aspects. *Placental weight* is thought to reflect function and the fetoplacental weight ratio has been suggested as a possible indicator of placental reserve capacity in IUGR<sup>4,5,6,7</sup>. In 2014, Every Newborn Action Plan (ENAP), was endorsed by the World Health Assembly which has a global target of 12 or fewer stillbirths per 1000 total births in every country by 2030. By 2019, 128 mainly high-income and upper middle-income countries had met this target.<sup>8,9,10</sup> The present study aims to find the association of placental weight with adverse pregnancy outcomes to prevent the occurrence of adverse pregnancy outcomes through antenatal prevention and care.

**MATERIAL AND METHODS**-The study followed women who had fetal death between 29 -37 weeks of clinical gestational age (Cases). The study also included women who delivered an appropriate for gestational age live birth between 29 -37 weeks (Control) in the Department of Obstetrics and Gynecology, JNMCH, AMU, Aligarh.

The study population was divided into two groups of cases and controls.

**Group I (Cases)** - The placenta from the stillbirth cases.

**Group II (Control)** -The placenta from the live birth pregnancies between 29 -37 weeks of gestation.

**Placental weight:** Each placental weight was recorded with a weighing machine in gram (gm).

## OBSERVATION AND RESULTS-

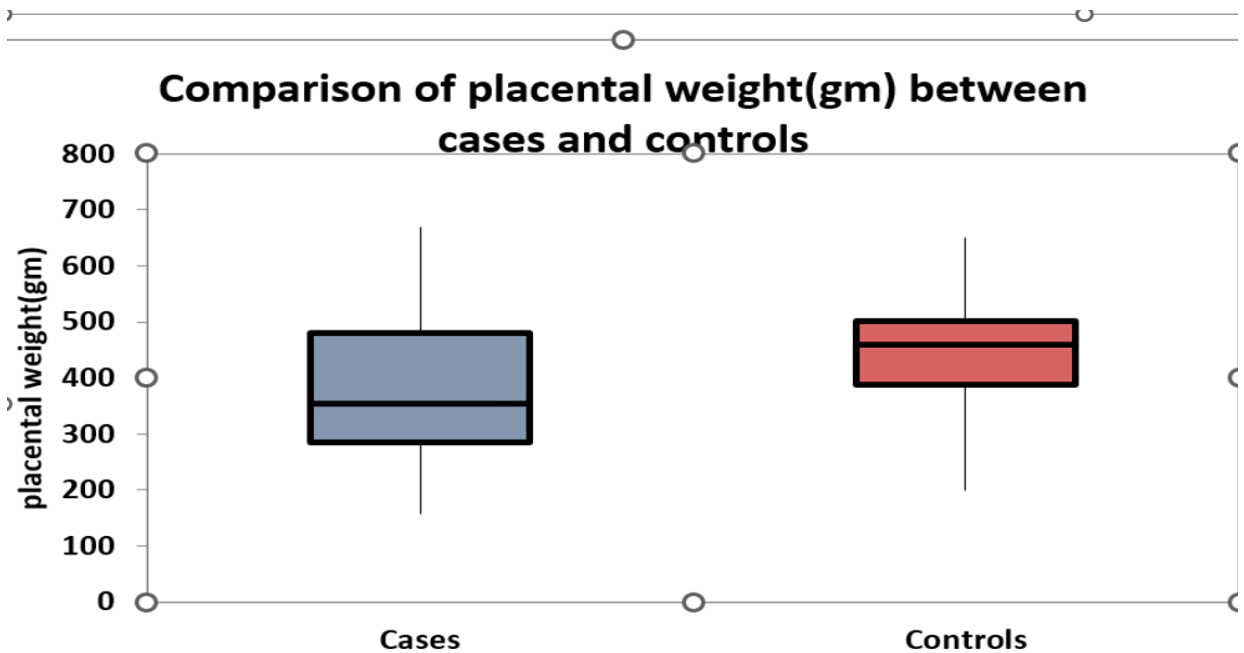
**Table No. 1-**

<b>Placental weight(gm)</b>	<b>Cases(n=100)</b>	<b>Controls(n=100)</b>	<b>P value</b>	<b>Odds ratio (95% CI)</b>
Mean $\pm$ SD	374.57 $\pm$ 113.74	444.68 $\pm$ 101.34	<b>&lt;.0001<sup>‡</sup></b>	0.994(0.991 to 0.997)
<b>Median (25th-75th percentile)</b>	355(285.25-480)	460(387.5-502.5)		
Range	158-670	200-650		

### **Mann Whitney test**

In present study, median (25<sup>th</sup>-75<sup>th</sup>) of placental weight (gm) in cases was 355 (285.25-480) which was significantly lower as compared to controls (355 vs. 460, P<.0001), with an overall odds ratio of 0.994 [460(387.5-502.5)]. (p value <.0001; Odds ratio (95% CI): - 0.994(0.991 to 0.997))

**Table No. 2-**



**DISCUSSION-** A case-control study was done wherein 100 cases of pregnant women who had still births were compared with 100 pregnant women who had live births, with the main objective to find the weight of placenta in the two groups and to compare them so as to find whether there is association between weight of placenta and pregnancy outcomes. In our study, we found that compared to controls, cases had significantly lower placental weight (355 vs. 460,  $P < .0001$ ), with an overall odds ratio of 0.994. This was in accordance with findings of previous studies as Åmark H et al<sup>1</sup> found that compared to women with live births, those with stillbirths had significantly lower Placental weight (423 vs. 480 g) ( $P < 0.05$ ). Similarly, Bukowski R et al<sup>12</sup> found that compared to live births, still births had significantly lesser placental weight (300 vs. 435 g,  $P < 0.001$ ). Even, Tiwari et al<sup>13</sup> also observe that smaller placentas showed significant association with stillbirths particularly term stillbirths. Ananthan et al<sup>14</sup> reported that in comparison with live birth, still birth cases had lower placental weight (360.83 vs. 373.81 g,  $P = 0.40$ ), however difference was not significant.

Thus, the findings indicate that placental weight is lower in still births as compared to live births, which can be explained by the fact that low level of pro-angiogenic factor results in small-sized placenta, leading to inadequate nutritional support to fetus as well as adverse maternal and fetal

outcomes. Moreover, the role of high levels of antiangiogenic proteins as well as low levels of proangiogenic proteins are observed among small-for-gestational age fetus.<sup>13</sup>

**Table No. 3- Showing comparison of Placental weight (grams) in different studies**

<b>Studies</b>	<b>Cases</b>	<b>Controls</b>	<b>P value</b>
Our study	355	460	P<.0001
Åmark H et al <sup>71</sup> (2021) 11	423	480	P<0.05
Ananthan et al <sup>67</sup> (2019)	360.83	373.81	P=0.40
Bukowski R et al <sup>65</sup> (2017) 14	300	435	P<0.001

The increased risk of stillbirth associated with low placental weight supports the hypothesis that a decreased placental surface area for gas and nutrient exchange may lead to fetal compromise.<sup>i</sup> Placental abnormalities are a common cause of death in stillbirth. Thus, histopathological examination of the placenta is recommended to determine the cause of stillbirth. Many maternal medical disorders are related to adverse pregnancy outcomes. Biologic mechanisms are proposed that describes how anaemia is related to adverse pregnancy outcomes. IUGR and preterm delivery are main determinants of stillbirth, which are related to maternal anaemia. A stress response can be activated by anemia in the mother and fetus by increasing levels of “corticotrophin-releasing hormone or cortisol” leading to adverse pregnancy outcomes.

**CONCLUSION:** The placenta provides nutrition to the growing foetus and is a pertinent determinant of fetal growth. It provides surface for gas exchange. Studies have shown positive correlation between placental weight and foetal weight. Low placental weight has also been found to be associated with IUGR, post-natal abnormalities. Through Antenatal Ultrasound Monitoring , the weight of the placenta can be accurately calculated and thus adverse pregnancy outcomes like

IUGR, STILLBIRTH etc can be prevented by providing pregnant women with vigilant antenatal monitoring and care.

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