



Fetal Outcomes of Abnormal Placental and Birth Weight Ratio

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Authors' contributions

This work was carried out in collaboration among all authors. Author UA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors Raishem, Asma Kashif, AD, Azra Khanam, MI and AA managed the analyses of the study and managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Objective: To find out the fetal complications of abnormal placental and birth weight ratio.

Materials and methods: This is a cross sectional study conducted from January 2019 to January 2020 at department of Gyn/Obs PMCH Nawabshah. Total 110 patients who met the criteria were included in this study. After history, clinical examination and required radiological and biochemical investigations, participants were delivered and weight of placenta and bay was measured and ratio was recorded. Results were made and conclusion was drawn.

Results: Age difference was also seen in participants. Maternal age ranged from 18-35 years. 65(59%) patients ranged from 18 to 25 years. 30(27%) patients were of age between 26-30 years. 16(14%) aged from 31-35 years. Regarding fetal outcomes, Intra Uterine Growth Retardation (IUGR) was found to be among 30(27.27%), IUD in 3(2.72%), fetal distress in 10 (9.09%), low

APGAR in 7(6.36%), respiratory distress in 6(5.45%) and Cardio Vascular Diseases in 0% patients. **Conclusion:** To sum up, it is concluded that in our study, the common fetal outcome due to abnormal Abnormal Placental And Birth Weight Ratio (PBWR) was intra uterine growth retardation (IUGR) followed by IUD, fetal distress and low APGAR.

Keywords: IUGR; Fetal distress; PBWR; Fetal outcomes; APGAR Score.

1. INTRODUCTION

The placenta is a temporary organ connecting the uterus and fetus for providing nutrition uptake, waste elimination, thermal regulation and gas exchange. It also fights against internal infection and produces hormones essential for supporting pregnancy [1]. It is expelled from the body after birth of baby. The average weight of placenta at term is 508 grams. Birth weight is the weight of body of baby at its birth. The average BW of baby is 3.5 kg [2].

Birth weight has proved to be strong indicator of chronic illness appeared in adulthood such as Coronary Heart disease (CHD), Hypertension (HTN), and Diabetes Mellitus (D.M). Those newborns who smaller gestational age (SGA) are vulnerable to develop heart diseases and Non insulin dependent D.M (NIDDM) in adolescents. Birth weight can be sometimes deceiving us. Newborns having AGA also develop Intra Uterine Growth Retardation (IUGR) with decline in birth weight.³

Placenta has been observed influencing the birth weight so its weight is directly related to birth weight. Resultantly, the ratio between the two has been affecting the fetal outcome. A high Placental weight/ Birth weight ratio (PW/BW ratio) was seen to be associated with development of Hypertension in adulthood, CHD, and glucose intolerance. Recently, PW/BW ratio has been deemed to be predictor of long term health risks [4,5].

The ratio between placenta weight and birth weight of newborn is 1:6. The methods of measurement differ due to placental preparations. Previous studies indicated that placental weight was associated with fetal outcome [6]. High placenta weight was associated with a poor prenatal outcome, a low Apgar score, respiratory distress syndrome and perinatal death whereas low placental weight was associated with complications in mother [7].

Clinical associations are seen with placental weight. Small placentas are associated with trisomies whereas large placentas are

associated with maternal diabetes. Large placentas indicate placental injuries resulting in villous edema or a chronic process requiring placental overgrowth such maternal anemia or mal nutrition. Small placentas are seen in maternal hypertension and results in distress of fetus or low Apgar scores [8]. recently, it is seen that fetal birth weights have increased over time. Positive correlation is seen between fetal weight and placental weights. The placenta can be weighed with membranes and cord attached but the standard approach is to weigh the placenta after the extra placental membranes and the umbilical cord are trimmed from the disk [9,10].

The rationale of study is to detect the placental and birth weight ratio and subsequent fetal outcome due to increase or decrease PBWR so that fetus and mother be saved from the forthcoming adverse outcomes.

2. MATERIALS AND METHODS

This is a cross sectional study conducted from January 2019 to January 2020 at department of Gyn/Obs PMCH Nawabshah. This is tertiary care hospital located in Distt S.B.A Sind and drains the patients not only from Sind but also from entire Pakistan. Total 110 patients who met the criteria were included in this study. The inclusion criteria included the patients with singleton full term delivery (37-42 weeks) and mothers willingness to participate in the study. Exclusion criteria incorporated retained placenta, morbidly adherent placenta, and placenta abruption and mothers refusal to participate in study. The history was taken in detail including the information about gestational age, maternal age and also the presence of maternal medical diseases. Gestational age was also estimated from ultrasound. All placenta was weighed soon after delivery on table top beam weighing scale along with membranes and cord after removing blood clots. The placental birth weight ratio was calculated as ratio of placental weight to neonatal weight multiplied by 100. Weight was recorded in grams. Statistical analysis was done. Results were noted and conclusion was made accordingly.

3. RESULTS

Total patients included in this study were 110. Age difference was also seen in participants. Maternal age ranged from 18-35 years. 65(59%) patients ranged from 18 to 25 years. 30(27%) patients were of age between 26-30 years. 16(14%) aged from 31-35 years.

There was difference according to parity also. 50(45%) patients were noted to be multiparous, 45(41%) primiparous and 16(14%) were nulliparous.

Neonatal gender was also noted. 70 (63.63%) Out of 110 patients were female and 40(36.37) were male. Gestational age was recorded from 37 to 42 weeks.

Placental weight was recorded from 587 to 595 g and birth weight was seen to from 3250 to 3299 g.

Regarding fetal outcomes, IUGR was found to be among 30(27.27%), IUD in 3(2.72%), fetal distress in 10 (9.09%), low APGAR in 7(6.36%), respiratory distress in 6(5.45%) and CVS diseases in 0% patients.

4. DISCUSSION

The placenta is specific organ of pregnancy that is essential for the survival of fetus by maintaining its growth and development. Therefore, any abnormality in placenta is directly proportional to maternal-fetal complications. These could be hypertension, IUGR, maternal or fetal anemia, D.M and congenital infection. Recent studies have indicated the relationship placental weight and growth of fetus. In twins, low birth weight and smaller placentas are seen as compared singleton. De Paepe et al reported lower placental and PBWR in his studies. Intra uterine growth restriction (IUGR) occurs in 12-15% [11] but in our study, the IUGR is higher up to 27.27% patients and is the most common complication of our study.

Table 1. Age Distribution Of Pregnant Women

S NO	AGE IN YRS	NO OF PTS	PERCENTAGE
1	18-25	65	59%
2	26-30	30	27%
3	31-35	16	14%
TOTAL	18-35	110	100%

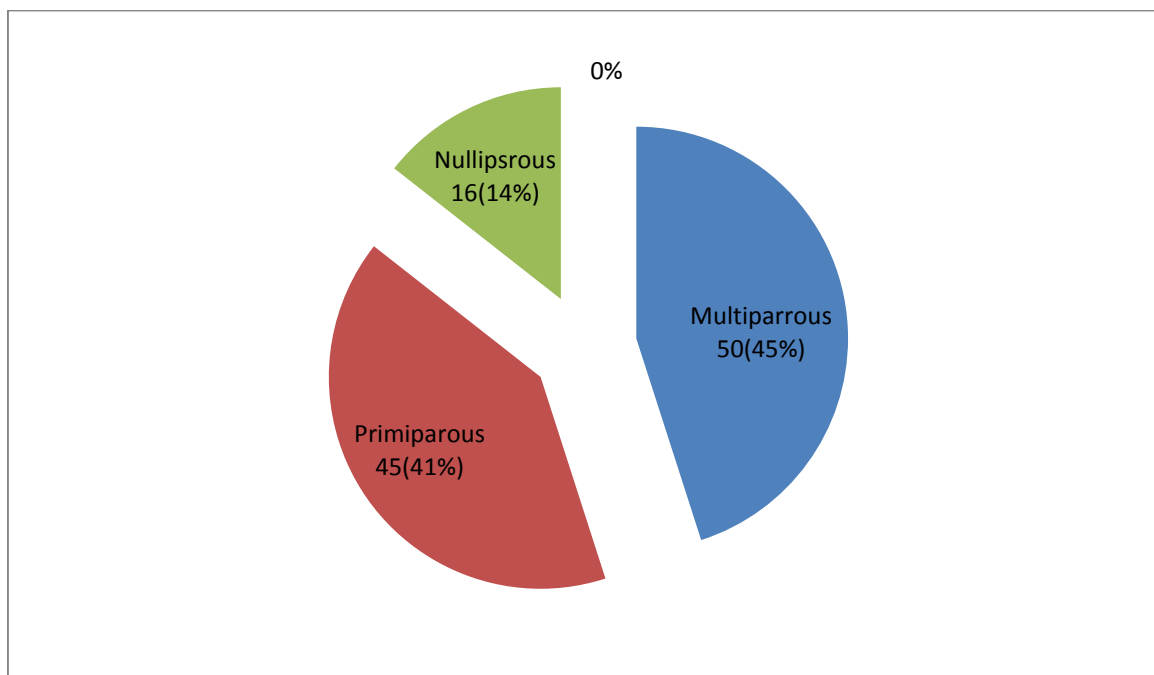


Fig. 1. Parity of the Patients

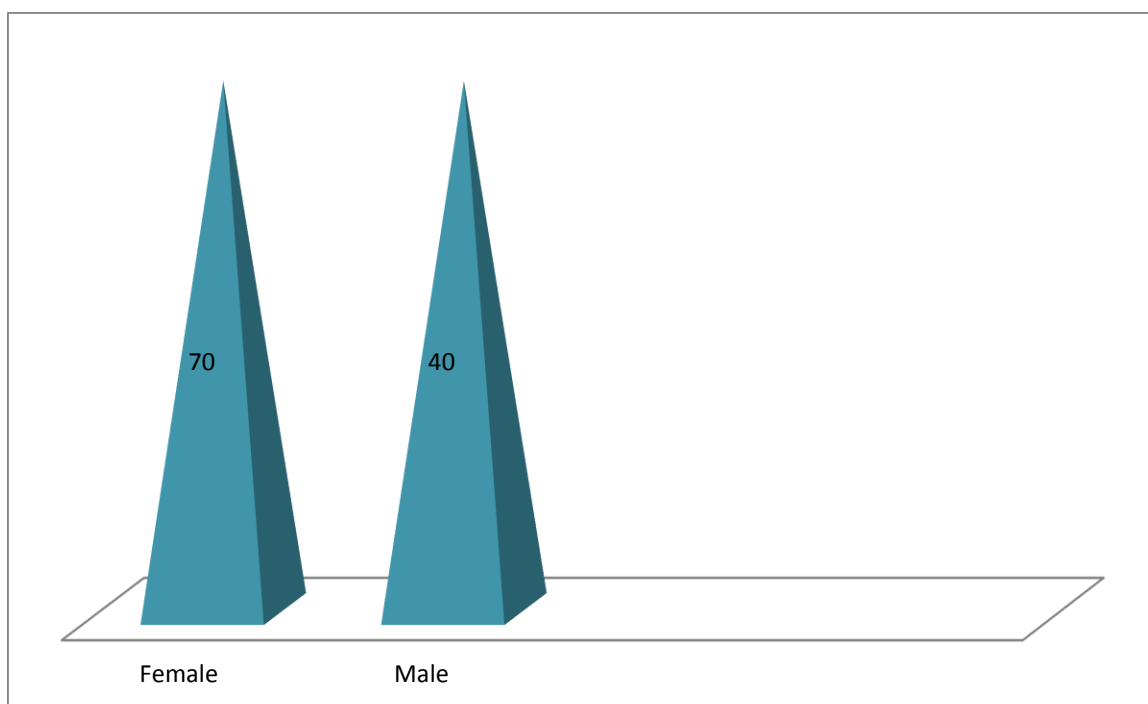


Fig. 2. Neonatal Gender

Table 2. Gestational Age

S NO	WEEKS	NO OF BIRTHS	PERCENTAGE
1	37	20	18.18%
2	38	48	43.63%
3	39	22	20%
4	40	11	10%
5	41	5	4.54%
6	42	4	3.65%
TOTAL	n=37-42	n=110	100%

Table 3. Showing Placental Weight and Birth Weight Ratio

FETAL SEX	NUMBER	%	BW	PW	PWBWR
F	70	63.63%	3250	587	18.2
M	40	36.36%	3299	595	18.1
TOTAL	110	100%			

Table 4. Fetal Outcomes with Abnormal PW/BW Ratio

SNO	FETAL OUTCOME	NO OF PATIENTS	PERCENTAGE
1	IUGR	30	27.27%
2	IUD	3	2.72%
3	FETAL DISTRESS	10	9.09%
4	LOW APGAR SCORE	7	6.36%
5	RESPIRATORY DISTRESS	6	5.45%
6	CVS DISEASE	0	0%
TOTAL		56	50.89%

The ratio between placental weight and birth weight is useful indicator of fetal nutrition and proper functioning of uterus and placenta. In a study, the placental weight was 590 g but in studies of Western Europe and Nigeria, it is between 630 to 643 g. In Asia and Ukraine, it is reported to be more than 588 g and 470 g respectively [12]. The differences in placental weight can be to varied methods of preparations of placenta and time of cord clamping. Regarding birth weight in a study, 3245, 3382 and 3400 g were seen in Ukraine, Western Europe and eastern Nigeria respectively. Birth weight in Asia is 3036 and 3103 in Afro-Caribbean region. In our study, placental weight is 587 and 595 g in female and male genders respectively [13].

In studies, the mean PBWR was 18% and 19.5% in Western Europe and Asia respectively. In Thailand and U.K studies, the PBWR was 17.08 and 13.9% respectively. In our study, PBWR in female gender is 18.2% and in Male babies it was 18.1% [14].

In a study, PBWR was noted to be lower with increasing gestational age at term. In our study same is observed. In another study, Abnormal high PBWR was recorded indicating an abnormal placenta with impaired function HIV infection, obesity, anemia and smoking. Infants with such increased ratios are at increased risk of perinatal death. Conversely, abnormal low PBWR indicate asymmetric growth restriction suggesting that small placenta limits optimal fetal growth [15].

In a study, age of participants ranged between 16-38 years and mean gestational age in similar study was lower than 39.9 weeks. In our study, the age of participants was between 18-35 years and gestational age was up to maximum 42 weeks [16].

5. CONCLUSION

To sum up, it is concluded that in our study, the common fetal outcome due to abnormal PBWR was intra uterine growth retardation (IUGR) and lower Placental Birth Weight Ratio (PBWR).

CONSENT AND ETHICAL APPROVAL

As per international standard or university standard guideline Patient's consent and ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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