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ANATOMICAL ASSESSMENT OF THE MORPHOLOGICAL CHANGES OF PLACENTAS FOLLOWING PARTURITION IN SOUTH- SOUTH, NIGERIA

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ABSTRACT

The usefulness of the placenta in the developing fetus cannot be overemphasized due to its elaborate functions. The placenta is formed by the cooperative effort between the extra embryonic tissue of the embryo and the endometrial tissue of the mother thus representing a symbiosis between the two without any rejection. This study is aimed at assessing the morphological changes of 150 placentas following parturition in five hospitals and different tribes in South-South, Nigeria. Questionnaires were distributed within the delivery suites in the five major hospitals, **(University of Calabar Teaching Hospital, General Hospital Calabar, Kendox Hospital Rivers State, Obio Hospital Rivers State and Alphonso Hospital Rivers State.)** where the mother's age, parity and maternal medical conditions were recorded **(Tribe Andoni: Maternal age 18-25, Parity 1-5, Placenta Weight 0.7kg, Medical condition Nil). (Tribe Ibibio: Maternal age 20-31, Parity 1-6, Placenta Weight 0.7kg, Medical Nil). (Tribe Annang: Maternal age 19-30, Parity 1-4, Placenta Weight 0.7kg, Medical condition Nil). (Tribe Oron: Maternal age 20-30, Parity 1-8, Placenta Weight 0.7kg, Medical condition Nil). (Tribe Eket: Maternal age 19-42, Parity 1-8, Placenta Weight 0.5kg, Medical condition diabetes mellitus). (Tribe Ogoni: Maternal age 19-35, Parity 1-5, Placenta Weight 0.6kg, Medical condition Nil). (Tribe Ikwere: Maternal age 19-28, Parity 1-6, Placenta Weight 0.7kg, Medical condition Nil). (Tribe Efik: Maternal age 19-45, Parity 1-7, Placenta Weight 0.5k, Medical condition Hypertension)**. Placental weight was measured using the basinet weighing scale after excising the umbilicus and squeezing out blood. All these were guided by the midwife on duty. The result showed that placenta weight varied significantly ($P < 0.05$) among different tribes. Eket and Oron had the highest mean parity of 9.00± 0.001 with Annang had the least mean parity of 0.60 ±0.03. Maternal age correlated significantly with placenta weight with a positive but weak relationship ($P <0.05$) at $r=0.214$. The parity was also significantly related to placenta weight ($P <0.05$) at $r=0.277$ where a weak but positive relationship was observed.

KEYWORD: Morphological Changes, Placentas Assessment and Parturition in South- South, Nigeria

INTRODUCTION

Background of the Study

Placenta is one of the vital organs in the body which supports the developing fetus. The placenta is responsible for the exchange of nutrients and protection of the fetus. It is represented by two components: the maternal and the fetal. The maternal component, also known as the basal plate, is in contact with the decidual and the fetal component, or chorionic plate, which is the site of insertion of the umbilical cord. Its main function is to provide everything that the developing fetus requires. During this process, the placenta selects and transports the substances necessary for fetal life and growth from the mother's blood; it also metabolizes some of these substances so that they can be easily and fully utilized by the fetus. The efficiency of the placenta in this function is dependent on the capability of uterine blood flow. (Balinsky, 2004; De Kock & Van der Walt. 2021).

The placenta barrier is formed by structures which represent both maternal and fetal blood, this barrier allows for selective permeability by the placenta.

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Water, oxygen, nutrients and hormones are allowed through the placental barrier from the mother to the fetus. While waste products are allowed from fetus to the mother. Placental functions can be classified as nutritional, respiratory, excretory, endocrine and protective with the transport of gases, nutritional substances, hormones, electrolytes, maternal antibodies, waste products drugs and even infectious agents. (Balinsky, 1981; De Kock & Van der Walt. 2004).

Human placenta is a discoid, deciduate, chorioallantoic, hemochorial, and villous organ. It is the most vital organ; its function often holds the key to fetal growth. It is an organ which transfers vital nutrients from mother to embryo and the waste products from embryo to mother. (Biswas et al., 2007). Its weight is approximately 1/6th of the fetal weight. Placenta is the principal cause of maternal and prenatal mortality if it is abnormal; and if there is a placental insufficiency, it can even lead to fetal growth retardation. (Kishwara et al., 2009).

After delivery, if the placenta is inspected meticulously, it can provide much insight into the prenatal health of the baby and the mother. (Majumdar *et al.,*2005). Pregnancy complications like hypertension or gestational diabetes are reflected in the placenta in a significant way. (Kishwara *et al*. 2009) found that the diameter and volume of the placenta were significantly reduced in preeclampsia patients. (Kishwara *et al.,* 2009).

Morphological, physiological or molecular changes in the placenta may serve as biomarkers of offspring health and risks. Currently, morphology and function are assessed through gross morphological assessments, histology, and imaging techniques. Advanced imaging could allow for more accurate, real-time assessments of placental function and fetal health, possibly improving prognoses and informing interventions. In addition to transcriptomic and proteomic characterization, epigenomic studies of normal and abnormal placentas will provide insight into mechanisms underlying altered gene expression in functionally compromised placentas. Stepping beyond the central dogma, metabolomic and secretomic studies will also add to a more comprehensive understanding of placental function. Because the environment is composed of a broad array of potential insults, identifying a specific biomarker associated with a given insult is daunting. Instead, identifying biomarkers of response that reflect changes in biological function as a consequence of an exposure may ultimately be more informative (Mesaros et al., 2015).

Aim of the Study

The aim of this research is to determine some morphological changes in the placenta following parturition.

The Specific Objectives is to:

Determine if increased maternal age affect placenta morphology Determine if the parity of the mother affect normal placenta morphology.

Correlate age with placenta weight using regression analysis

Correlate parity with placenta weight using regression analysis

Determine morphologic changes of placenta with maternal medical condition (Diabetes and Hypertension).

Statement of Problem

There is little or no study in our environment on placenta morphology as it related to increased maternal age and parity.

Hence the study seeks to investigate the changes in placenta morphology with increased maternal age and parity.

Overtime there is paucity of information on placenta morphology in South South, Nigeria. This study provides data on placenta morphology in this study population.

Fetal well-being is solely dependent on a healthy placenta hence the need to study the morphology in South-south, Nigeria.

Significance of the Study

This study investigated the causes of morphological changes of the placenta. And to urge midwives to apply the universal method to examine placenta in the delivery room, with documentation of findings and submission of tissue for pathologic evaluation based on abnormal appearance or certain clinical indications.

Scope of the Study

This research is limited to Anatomical Assessment of the Morphology of

Placenta in the Obstetric Department in five different Hospitals in South-South,

Nigeria.

MATERIALS AND METHODS

Material

Basinet Weighing Scale, Measuring Tape, Gloves, Questionnaire Form,

Collecting Nylon.

Data Collection

Data collection was done using an open questionnaire. The contents of the questionnaire included. Age of mother, parity and medical condition associated with pregnancy and tribe of mother. This was done in Five Hospitals within the South – south region of Nigeria: viz: University of Calabar Teaching Hospital, General Hospital Calabar, Kendox Hospital Rivers State, Obio Hospital in Rivers State and Alphonso Hospital in Akwa Ibom State.

Filled questionnaires were grouped and based on the Age, parity, maternal medical condition, tribe of mother and placenta weight.

Method of Examination of Placenta

The collected placenta was carefully squeezed to milk out blood from within the tissue and washed under running tap water. The cord and the membranes were cut and trimmed respectively and the placenta measured using the basinet weighing scale.

Statistical Analysis

Obtained data were grouped and analyze statistically using ***one way ANOVA followed with Duncan post hoc test***. Correlation of the measured and documented values gotten from questionnaire was done between maternal age and placenta weight, parity and placenta weight and maternal medical condition and placental weight.

Inclusion Criteria

All healthy placentas following inspection by the midwife or obstetrician.

Placenta with intact membranes.

All women who had spontaneous vagina delivery

Exclusion Criteria

All unhealthy placentas; for example, those with calcifications.

Placenta with incomplete membranes

Thorn or retained segments of the placenta tissue.

Clearance for Data Collection

This was obtained from the Department of Anatomical Sciences University of Calabar, Calabar, Nigeria and duty signed by the Head of Department and Project Supervisor

However, ethical approval was gotten from the individual hospital where research was conducted.

RESULT

The total number of 150 placentas was used for the research analysis in Eight different tribes in three states (Rivers, Akwa Ibom, Cross River) to determine the maternal age different, parity and medical condition on placenta weight. It was observed that Ikwerre tribe had the highest number of birth and Oron had the least number of births. Eket had the highest number of maternal age of about 33.00 ± 0.001 and Annang had the least number of maternal age. Eket and Oron tribes had the highest mean parity of about 9.00 ± 0.001 respectively. Andoni followed next with 0.83 ± 0.02 the least parity was recorded by Annang although it was no significantly different from Ibibio, Ikwerre and Efik.

TABLE 1: Mean age, parity and placenta weights of mothers from different tribes

Tribe	n	Maternal Age (yr)	Parity	Placenta weight (g)
Andoni	6	28.50 ±1.89 [a]	1.83 ±0.31 [a]	0.83 ±0.02 [b.c]
Ibibio	46	29.43 ±0.67[a]	1.74 ±0.12[a]	0.69 ±0.02[a]
Annang	10	29.30 ±0.67[a]	1.90 ±0.43[a]	0.60 ±0.03[a]
Oron	2	30.00 ±0.001[a]	3.00 ±0.001[a]	0.90 ±0.001[c]
Ogoni	21	29.43 ±1.23[a]	2.00 ±0.18[a]	0.74 ±0.03[a,b]
Eket	2	33.00 ±0.001[a]	3.00 ±0.001[a]	0.90 ±0.001[c]
Ikwerre	53	29.38 ±0.44[a]	2.25 ±0.14[a]	0.77 ±0.02a,b,c
Efik	7	29.86 ±0.94[a]	1.86 ±0.34[a]	0.69 ±0.05[a]

Values are expressed as mean ±SEM

Mean values with similar symbols are not significantly different

There was no significant difference in the mean ages of the respondent from the different tribes. Also, the parity did not differ significantly among the different tribes.

However, the placenta weight varied significantly ($P<0.05$) among the difference tribes. Eket and Oron tribes had the highest mean parity of 9.00± 0.001. Andoni followed next with 0.83 ± 0.02 the least parity was recorded by Anang. Although, it was not significantly different from Ibibio, Ikwerre and Efik

Age (yrs)

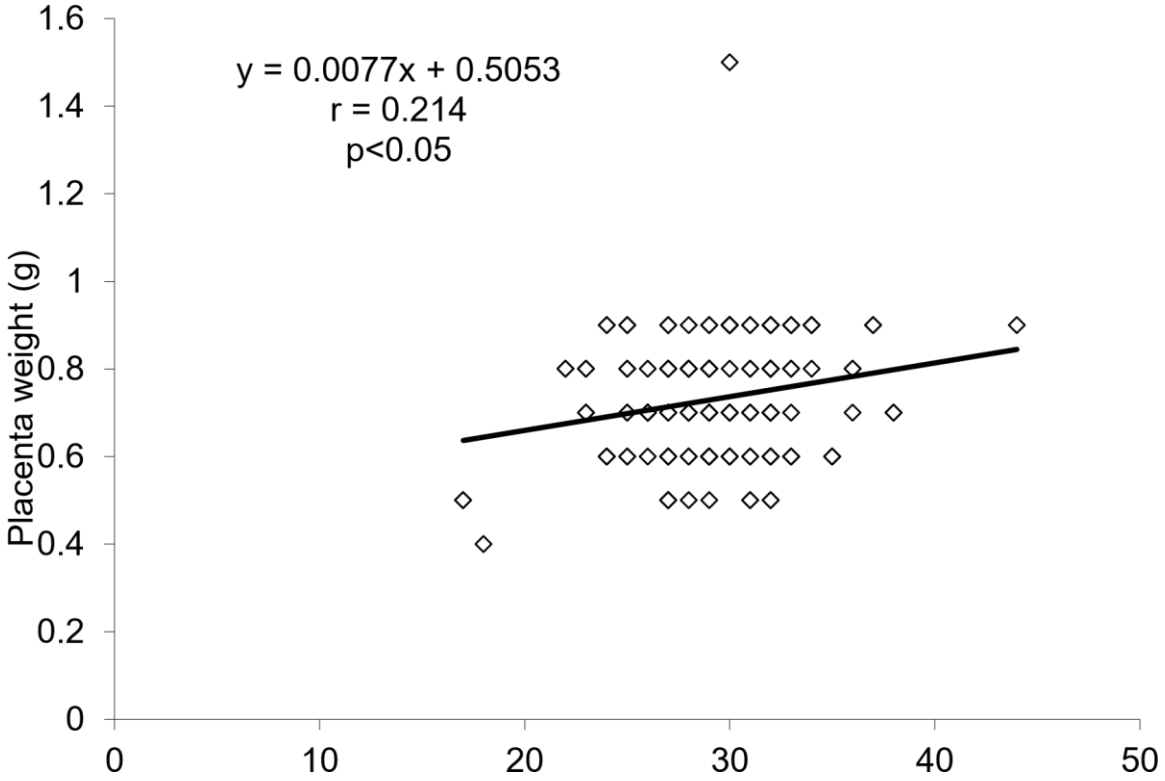

Figure 1: Relationship between Maternal age and placenta weight, N = 150.

The maternal age correlated significantly with the placenta weight was shown in figure 1 the relationship was positive and weak Parity

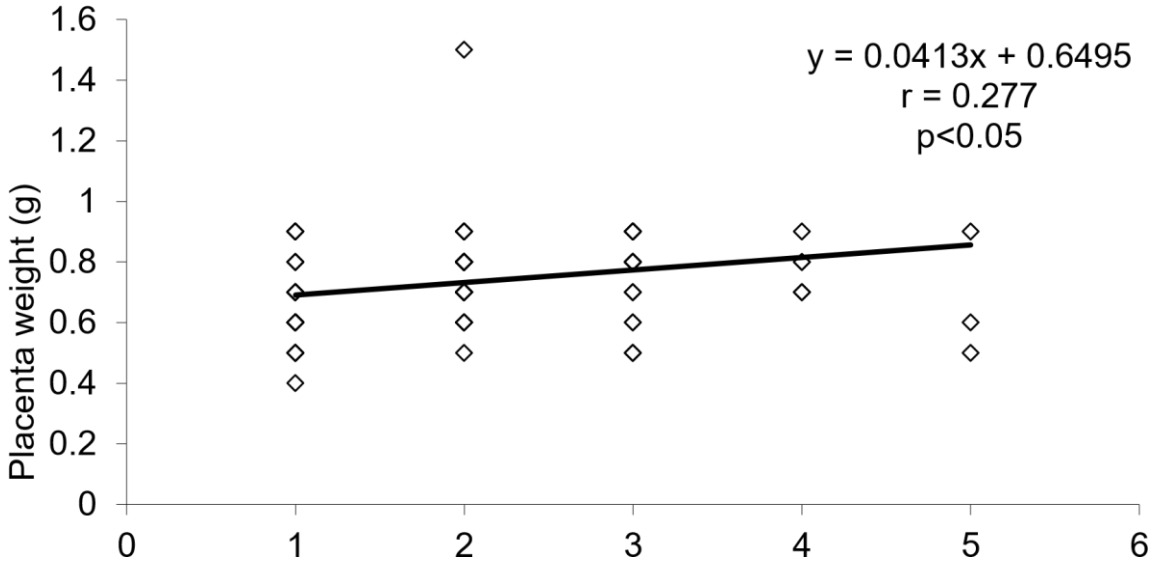

Figure 2: Relationship between parity and placenta weight N = 150.

The parity also related significantly (P< 0.005) with the placenta weight (r =0.277). A weak and positive relationship was observed.

Plate 5: Abnormal decrease placenta weight (from delivery room in the Hopital)

Plate 6: Abnormal increase placenta weight (from delivery room in the Hospital)

Plate 7: Placenta on Basinet weight scale (from delivery room in the Hospital)

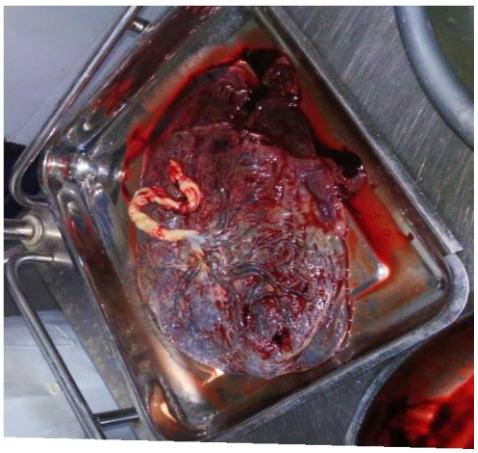

Plate 8: Normal Placenta (from delivery room in the Hospital)

DISCUSSION

The placenta remains a vital organ necessary for the development of the fetus till term as it is the sole source of nourishment, oxygenation and metabolism for the fetus.

This study aims at assessing the morphology of the placenta, specifically changes in weight in women in South-south following parturition.

Parameters such as age, parity and maternal medical condition were variables taken into considerations.

This study shows a positive correlation between the maternal age and placenta weight. This correlation though weak depicts that with increase maternal age, there is a minimal increase in placenta weight this however indicate the risk in utero of placenta previa.

As earlier documented in a study by (Kinare A. et al 2000) maternal age has positive significance with the weight of the placenta.

Similarly, this study shows a weak but positive correlation between parity of mother and placenta weight. However, the correlation tends to be stronger with maternal medical condition such as diabetes with placental weight.

Generally, Maternal age is known as a principal and determined factor of placental weight. The capacity of fetal weight growth is determined by placental weight.

This is in concordance with the work of (Molteni R. 1978) that said average placental weight is related to gestational age. Placental weight increases in infants with small gestation age and no changes has shown from 36 weeks' gestation. This corresponds with the work of (Fox H. 1963) that says placental normal weight is 450g – 500g. placenta tends to be smaller in preeclampsia that those with uncomplicated pregnancies.

Medical condition was also significantly related to placenta weight. A research from (Silasi M. 2010) shown that placenta weight change according to various pregnancy. Lower placental weight is associated with chronic hypertension/preeclampsia, whereas a higher placental weight is associated with maternal anemia, gestational diabetes and fetal growth restriction. Other factors influencing placental weight include parity, maternal height and weight. From the result of the project, there was no significant difference in the mean ages of the respondent from the different tribes. Also the parity did not differ significantly among the different tribes.

However, the placenta weight varied significantly ($P<0.05$) among the difference tribes. Eket and Oron tribes had the highest mean parity of 9.00 ± 0.001, Andori followed next with 0.83 ± 0.02 the least parity was recorded by Annang. Although, it was not significantly different from Ibibio, Ikwerre and Efik.

The result shows that, in the eight different tribes. Ikwerre had the highest number of birth with 0.77 ± 0.02 placental weight followed by Ibibio with 0.69 ± 0.02 placental weight. Oron and Eket had the same number of birth and with the same placenta weight of 0.90 ± 0.001.

Finally, it was discovered that the placental weight varied significantly

($P<0.05$) among different tribes in South – South, Nigeria.

CONCLUSION

Anatomical Assessment of the Morphological Changes of Placentas Following Parturition in South-South, Nigeria between maternal age, parity with placenta weight while the correlation tends to be stronger with maternal medical condition such as Diabetes mellitus with placenta weight.

However, other study revealed the placenta weight tend to reduce with maternal medical conditions such as hypertension/preeclampsia

RECOMMENDATION

Sequel to the finding of the study, the following recommendations are made:

Women should put to birth in early twentieth to avoid medical

complications during parturition.

The government should have organized public enlightenment programmes on antenatal and post-natal in order to re-orientate people on health practices.

Further work is needed to elucidate how such changes in microcotyledon morphology and efficiency are brought about

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