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RELATIONSHIP BETWEEN WEIGHT GAIN IN PREGNANCY AND BIRTH WEIGHT: A CASE STUDY OF A PRIMARY HEALTH CENTRE IN DELTA STATE, NIGERIA

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ABSTRACT

Birth weight is an important determinant of infant well being. In this study, the relationship between weight gain in pregnancy and birth weight was investigated. A total of one hundred and fifty apparently healthy consenting pregnant women who delivered at Baptist Hospital Eku, Delta State, Nigeria, from 2008-2011, were recruited for this study. Those with extremes of weight and other chronic ailments were excluded from this study. The result showed a significant ($p<0.05$) relationship and correlation ($r = 0.3266$) between the weight gain in pregnancy and birth weight. It also showed that for a 1kg increase in maternal weight in Pregnancy there is a 0.3266 increase in fetal weight. It is therefore advised that pregnant mothers should aim at an optimal weight during pregnancy for the well being of their babies.

Keywords: Weight Gain, Pregnancy, Birth Weight

INTRODUCTION

The association between birth weight, morbidity and mortality has been confirmed repeatedly **[1]** and with developmental problems in childhood **[2, 3]** and the risk of various diseases in adulthood **[4]**. In the last two decades, some of the low birth weight risk factors have been investigated e.g smoking during pregnancy, multiple birth,

pregnancy problems, parity, maternal job, maternal age, maternal height, gestational age, low income and overcrowding**[2]**.

Across the world neonatal mortality is twenty times more likely for low birth weight babies (<2.5kg) compared to heavier babies in developing countries the condition is largely attributed to intrauterine growth retardation as compared to prematurity in developed countries **[5]**.

Birth weight is an important determinant of infant well being **[6]**. Several factors such as mother's genetic characteristics, social cultural demographic, behavioural factor, pre-pregnancy body mass index, gestational weight gain etc contribute to birth weight **[7]**. Birth weight is important as low birth weight is known to increase the risk of adult onset diseases like type 2 diabetes and ischemia heart disease **[6]**. Rapid weight gain is one of the most important independent predictors of infant birth weight **[8]**.

Birth weight has been correlated with maternal exposure to air pollution **[9]**. Research have shown that elevated blood lead levels in pregnant women, even those well below 10mg/dl can cause premature birth and low birth weight in offsprings**[10]**. Exposure to mercury, a toxic heavy metal, during pregnancy may have an effect on birth weight of offspring **[11]**. It has also been revealed that the exposure of pregnant women to air plane noise was found to be associated with a decrease in body weight of new born babies **[12, 13]**.

Maternal characteristics are an important group of variables in baby's weight. It has been shown that the birth weight was lower in the case of low maternal pre-pregnancy weight and low parity **[14,15]**. There is association between low birth weight and mother's age, parity, weight gain and health problems during pregnancy **[16, 15]**. Weight gain during pregnancy is important for optimal pregnancy outcomes **[17]**.

This present study therefore; seek to find a relationship between maternal weight gain during pregnancy and the birth weight of baby.

MATERIALS AND METHODS

Study Area

This study was carried out in Eku, a populated sub-urban area in Delta State, in the Niger Delta part of Nigeria. It has a population of 50,390 in which there is a male population of 24,786 and female population of 25,818 **[18]**.

Study Population, Data Collection.

The population of the study compromises of 150 pregnant women who attended ante-natal clinic and delivered in the Baptist hospital Eku, between 2009 and 2011. Women with pregnancy induced hypertension, diabetes mellitus, parity greater than four, renal disease, smokers and other chronic ailments e.g. sickle cell, and asthma were excluded from this study. Maternal age, weight and birth weight of the babies' data were collected for this study; The data were collected from the hospital records containing antenatal booking and delivery case records with pre-pregnancy weight recorded.

Population Under Study

During the course of study, pregnant females with ages ranging from 18 to 45 years of age were considered. The total number of subjects used for the study was 150 pregnant females. These subjects were those who registered with Baptist Hospital Eku Delta State, Nigeria for antenatal care.

Sampling Methods

This cross sectional retrospective study was carried out at Baptist hospital Eku. All consenting pregnant women attending anti-natal clinic at Baptist hospital Eku from 2009-2011 who met the inclusion criteria were recruited for the study. The pre-pregnancy maternal weights were recorded and their weights at the day of delivery also recorded.

Ethical approval to conduct this study was granted by the Local ethical committee of Baptist Hospital, Eku.

Statistical Analysis

Statistical analysis was performed to evaluate the relationship between weight gain in pregnancy and birth weight of the babies. Statistical soft ware SPSS version 16.0 was used for analysis. The data collected were analyzed for statistics of weight gain in pregnancy and birth weight of the baby using simple linear correlation and regression test and ANOVA, the level of significance was considered at $P<0.05$.

RESULT AND DISCUSSION

The result of this study is represented graphically; there was a significant difference in weight gained in pregnancy (8.43 ± 0.9) and birth weight (3.20 ± 0.56) using the Analysis of Variance, Correlation and Regression statistics.

Table 1: Showing Estimated Regression Coefficient and Correlation Influence of Weight Gain in Pregnancy on the Birth Weight of Baby

N	Pregnancy Weight Gain (kg)	Birth Weight (kg)	r cal	r crit (F0.05)	Regression coefficient
150	8.43 ± 0.9	3.20 ± 0.56	5.32	0.0113	0.3266

The result showed that calculated *r* value is greater than the table value which means it is a highly significant regression and therefore birth weight is dependent on pregnancy weight gain. The ANOVA relationship between weight gain in pregnancy and birth weight of baby indicate that there was a statistical significant difference (*p<0.05)*. This study also showed that weight gain in pregnancy has a positive linear relationship (correlation) with the birth weight. Also, from the table above, the equation for regression coefficient showed that for every increase in pregnancy weight gain of 1kg the increase in the birth weight of the baby is 0.3266.

Weight gain during pregnancy is a major contributor to body weight and obesity for women **[19]**. Numerous studies gave report that excessive weight gain after delivery is a predictor of long term obesity **[20]**. According to **[21]**, inadequate weight gain during pregnancy particularly in the third trimester increases women risk of preterm delivery. The mean weight gain during this present study was found to be 8.43 ± 0.9 kg, while the mean birth weight of the infant was found to be 3.20 ± 0.56 kg which was comparable to the general acceptable weight gain in pregnancy (6.75 to 11.25) kg and birth weight (2.50 to 4.0) kg as stated by **[22]**. The birth weight was observed to increase with an increase in the weight gain in pregnancy which is consistent with several studies **[23, 24, 25]**.

CONCLUSION

From the observed result, there is a positive linear relationship between the weight gain in pregnancy and birth weight of baby such that for every increase of 1kg weight gain in pregnancy there is an increase of 0.3266 Kg in the fetus. It is therefore advisable that pregnant mothers should keep an optimum weight during pregnancy for the well being of the baby.

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