

## Predictors of Low Birth Weight at an Emerging Teaching Hospital in Southwest Nigeria

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Article Received: 01-02-2023, Revised: 25-02- 2023, Accepted: 27-02-2023

### ABSTRACT:

**Introduction:** The child survival rate, mental development and future physical growth have a lot to do with birth weight. It is an important risk factor for child morbidity and mortality. This study, therefore, critically appraised LBW and its predictors in southwest Nigeria. **Material and methods:** This was an observation prospective study carried out at the department of Obstetrics and Gynaecology of Ekiti State University Teaching Hospital (EKSUTH), Ado Ekiti Southwest Nigeria between 1st January 2015 to December 31st 2015. Socio-demographic, feto-maternal and clinical characteristics were extracted from a large obstetric database using a comprehensive proforma. Data collected were entered and analyzed, using Statistical Software for Social Sciences version 21 (SPSS 21, IBM, Chicago). Continuous variables were analysed using mean and standard deviation while categorical variables were presented in frequency and percentages. **Result:** The mean age of clients with both low and normal birthweights was comparable 29.29± 4.987 years versus 30.03 ±4.62 years (P value=0.06) respectively. However, there is a statistically significant difference between the two groups with respect to their marital status and their educational background. (P=0.023, <0.01). Patients with a history of pregnancy-induced Hypertension, eclampsia and IUGR are more at risk of having low birth weight babies, P value= (0.001, <0.001, <0.001). **Conclusion:** Early initialization of antenatal care, timely detection of obstetric complications and institution of prompt management and appropriate delivery plan will go a long way in the prevention of low birth weight.

**Keywords:** Predictors, low birth weight, southwest, Nigeria

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### How to Cite:

Ade-Ojo, Idowu Pius<sup>1</sup>, Adeyanju, Benedict Tolulope<sup>2</sup>, Olofinbiyi, Babatunde Ajayi<sup>1\*</sup>, Adeniyi Omotayo Oladele<sup>3</sup>, Adelekan, Oluseyi Emmanuel<sup>2</sup>, Atiba, Bamidele Paul<sup>4</sup>, Okunola, Temitope Omoladun<sup>1</sup>, Adefisan, Adeyemi Sunday<sup>1</sup>, Olofinbiyi, Rebecca Oluwafunke<sup>5</sup>, & Ogunkorode, Agatha<sup>6</sup>, Ajibare, A.J.<sup>7</sup>, Ibiyemi, S.A.<sup>8</sup>. (2023). Predictors of Low Birth Weight at an Emerging Teaching Hospital in Southwest Nigeria. *International Invention of Scientific Journal*, 7(01), Page: 27–32. Retrieved from <http://iisj.in/index.php/iisj/article/view/390>

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## **INTRODUCTION:**

A Low-birth-weight baby (LBW), according to the World Health Organization (WHO), is a newborn weighing below 2,500 grams, with the measurement taken within the first sixty minutes of life<sup>(1)</sup>. Birth weight is important as it is one of the yardsticks to measure child's survival rate, mental development and future physical growth including obesity. It is an important risk factor for child morbidity and mortality<sup>(2)</sup>. Globally, the prevalence of LBW is 14%; in the Eastern and Southern Part of Nigeria its prevalence is 15.2% and 11.3% respectively. A study showed that more than 96% of LBW newborns are born in developing countries<sup>(3,4)</sup>; factors associated with low birth weight in these countries include low socioeconomic status, poor nutrition, infections and infestations, increased pregnancy age, too many babies and too short pregnancy intervals<sup>(4)</sup>. Women with a low educational background may not take antenatal care (ANC) seriously due to a lack of funds; instead, they prefer to receive care from traditional birth attendants because they see no reason to visit the hospital. Decision-making difficulties may be impeding their visit to the hospital, as the majority of women rely on their husbands to give them permission to visit health care facilities<sup>(3,4)</sup>. Due to the fact that most clinics in Africa are too far away for pregnant women to reach, they prefer to stay at home rather than go to an ANC appointment. Antenatal clinics visit has been shown to improve birth weight as many factors that can mitigate against healthy baby and mother are sorted out during the clinics. There are numerous maternal and fetal factors contributing to the LBW incident. Pregnant mothers who smoke are also found to be at high risk of delivering LBW babies. A previous study also showed that taking antimalaria especially around 16 weeks could reduce the burden of malaria parasitaemia that has been implicated in LBW babies. Other risk factors are linked to lack of quality antenatal care, body mass index (BMI), parity, multiple gestations. Paternal factors such as level of education and employment were also significantly linked with the incidence of LBW<sup>(3)</sup>. Chronic illnesses in mothers have a lot to do with their baby's birth weight. Patients with preeclampsia and diabetic mellitus are at risk of delivering LBW babies. Most metabolic medical conditions lead to uteroplacental insufficiency reducing oxygen and nutrient supply to the developing fetus. Although Urbanization has been associated with

improved child health outcomes due to increased access to improved health care services with a good health insurance system it is still not without its own challenge. Only a very few studies explored the pattern and predictors of low birth weight in the South-west Nigeria, as there is generally low reporting of birth weight in Nigeria<sup>(3)</sup>. This study, therefore, critically appraises LBW and its predictors in the southwest Nigeria.

## **MATERIAL AND METHODS:**

This was an observational and prospective study carried out at the department of Obstetrics and Gynaecology of Ekiti State University Teaching Hospital (EKSUTH), Ado Ekiti, Southwest Nigeria between January 1st, 2015 to December 31st, 2015. The tertiary facility is the teaching hospital for the college of medicine. Ekiti State University Teaching hospital that turned out its first set of medical graduands in July 2019. The Teaching hospital serves as the main referral center for private hospitals, primary and secondary health institutions in the state and part of Kogi, Kwara, Osun and Ondo state. The hospital runs 4 antenatal clinics in a week and 24-hour emergency obstetrics and gynaecological services Feto-maternal sociodemographic and clinical characteristics were extracted into a large obstetric database using a comprehensive proforma comprising about ninety items and covering 180 variables. These variables include sociodemographic data, previous obstetrics and gynaecological information, index pregnancy antepartum, intrapartum and postpartum events with observed complications and perinatal outcomes. Information was extracted from the patients' case file and complemented with additional relevant pieces of information from parturients themselves and the nurses' health records to ensure completeness. Data collected were entered into, and analyzed, using Statistical Software for Social Sciences version 21 (SPSS 21, IBM, Chicago). Continuous variables were analysed using mean and standard deviation while categorical variables were presented in frequency and percentages. Test of significance was done with Student's t-test or ANOVA for continuous variables, while Chi-square and Fisher's exact tests were used for categorical variables. The level of significance was set at  $p < 0.05$ .

## **RESULTS:**

**Table 1: SOCIODEMOGRAPHIC CHARACTERISTICS**

Characteristics	Low birth weight	Normal birth weight	X <sup>2</sup>	P value
Age (mean ± SD)	29. 27± 4. 987	30.03± 4.62	0.76± 0.41	0.06
Parity (mean ± SD)	1. 12± 1.24	0.01± 0.24	0.01± 0.10	0.88
Income (mean ± SD)	\$589± \$ 408	\$759± 647	\$172± 105	.88.

Ethnic group: Yoruba	126 (8.5) 1 {20)	1359 (91.5) 4 (80)	41.66	0.07
Hausa	11 (12.02)	79 (87.8)		
Others	7 (013.2)	46 (86.8)		
Marital status: Married	136 (55.8)	1464 (91.5)	24.88	<0.01
Single	9 (27.3)	24 (71.7)		
Educational status: None	1 (16.7)	5 (83.3)	18.87	0.02
Primary	5 (13.9)	31 (86.1)		
Secondary	41 (11.3)	322 (88.7)		
Tertiary	98 (7.9)	1150 (92.1)		
Health insurance: Yes	01 (3)	32 (97)	1.42	0.23
No	144 (9)	1456 (91)		

The mean age of clients with both low and normal birth weight was comparable 29.29± 4.987 years versus 30.03 ±4.62 years respectively(P-value=0.06). Likewise, the mean parous experience among the clients with low and normal birth weight was also comparable 1.12±1.24 versus 0.01±0.24(P value=0.88). Income of the client

and ethnicity and access to health insurance scheme were not different statistically among them (P value= 0.88, 0.07, 0.23) However, there is a significant statistical difference between the two groups with respect to their marital status and their educational background. (P=0.023, <0.01).

**TABLE 2: OBSTETRIC OUTCOMES**

Factors	Low birth weight	Normal birth weight	X <sup>2</sup>	P value
Previous miscarriage Yes	18 (9.2)	178 (90.8)	0.22	0.89
No	535 (97.8)	75 (75%)		
Previous CD: Yes	16 (7.2)	205 (92.8)	1.58	0.67
No	520 (95.1)	95 (74.8)		
Preexisting medical illness Yes	0	6 (100)	0.59	0.75
No	145 (8.9)	1482 (91.1)		
Early booking: Yes	19 (8.2)	212 (91.8)	0.14	0.71
No	126 (9.0)	1276 (91)		
PIH: Yes	51 (15.8)	271 (84.2)	24.01	<0.001
No	94 (7.2)	1217 (92.8)		
Preeclampsia: Yes	24 (28.2)	61 (71.8)	41.9	<0.001
No	121 (7.8)	1427 (92.2)		
IUGR: Yes	9 (33.3)	18 (66.7)	20.67	<0.001
No	136 (8.5)	1470 (91.5)		
HIV infection: Yes	6 (13.6)	38 (86.4)	1.26	0.26
No	139 (8.7)	1450 (91.3)		

Table 2 illustrates the obstetric outcome among the participants of the study. It shows that patients with a previous history of miscarriage, pre-existing medical

illness, HIV Infection and history of congenital anomalies are not statistically at risk of LBW. However, patients with a history of pregnancy-induced

Hypertension, eclampsia and IUGR are more at risk of having low birth weight babies, P value= (0.001, <0.001,<0.001). About 16% of patients with PIH had babies with low birth weight which is twice the risk with a patient with no PIH. In the same vein, 28.2% of the

clients with pre-eclampsia which is 4 times of those without pre-eclampsia had babies with low birth weight. Women with previous history of IUGR have more than 4 times risk of having babies with low birth weight (33.3% Vs 8.5%)

**TABLE 3: PREDICTORS OF LOW BIRTH WEIGHT**

Predictors	Odd .....	95% CI	P value	Ref.
Single marital status	1.85	1.28 – 20.33	0.002	None
Educational status:				
Primary school	2. 80	0.44 – 11.20	0.99	None
Secondary school	2. 01	0.17 – 8.25	0.99	-----
Tertiary school	1.73	1.59 – 9.67	0.04	-----
PIH	2.45	1.69 – 3.51	< 0.001	Normal
Preeclampsia	1.88	1.23 – 6.84	0.001	Normal
IUGR	2.05	1.49 – 8.07	< 0.001	Normal

The strong tie between marital status was clearly seen. The factors that showed the strongest association with the low birth weight after correlations and multiple regression analysis were done to determine their relationship with low birth weight at P<0.05 significance were marital status, educational background, pregnancy-induced hypertension, pre-eclampsia and intrauterine growth restriction. All five were positively correlated except for educational status which was not statistically significant.

**DISCUSSION:**

Sociodemographic and obstetric factors were studied to know if they could predict low birth weight among pregnant women; these include single marital status, educational status, PIH, Pre-eclampsia and IUGR. Single marital status was found to influence low birth weight in this study (OD=1.81, 1.28-20.33), P-value =0.002; this was in tandem with what was found by Sung J.F in a study<sup>(7)</sup>. This could be because the care received by these pregnant women was sub-optimal for poor spousal support among other things. Pregnant women who do not receive adequate emotional and psychological support are more likely to be negligent with their unborn children, which can result in low birth weight<sup>(8)</sup>. Unlike what was popularly believed, this study has not established that maternal age has a detrimental effect on a baby's birth weight<sup>(9)</sup>.

Although it is generally believed that maternal medical conditions could adversely affect the birth weight of the fetus, this study corroborated the fact that PIH and pre-eclampsia contributed immensely to the occurrence of low birth weight in southwest Nigeria<sup>(10)</sup>. This study shows the odds of having LBW in a patient with PIH (OD 2.45 (CI 1.69-3.51); p-value <0.001. Chronic illnesses in mothers have a lot to do with their baby's

birth weight. Patients with pregnancy-induced hypertension, preeclampsia and diabetic mellitus are at risk of delivering LBW babies<sup>(10)</sup>. Most metabolic medical conditions lead to uteroplacental insufficiency, narrowing the blood vessels reducing oxygen and nutrient supply to the developing fetus. In the same vein maternal age and parity were found by Joel Medewase et al to significantly affect the occurrence of low birth weight, however, the findings here refuted the fact; this may be because of the higher number of participants used as against the number in this study<sup>(6)</sup>. Furthermore, many studies have indicated that HIV infected women have an increased risk of delivering low birth weight or preterm babies compared with uninfected ones this was invariance with our study where there is no significant statistical difference between babies who are HIV exposed or non-exposed babies<sup>(9,11,12)</sup>. Early initialization of antenatal care, timely detection of obstetric complications and institution of prompt management and appropriate delivery plan will go a long way in the prevention of low birth weight. In addition, the roles of antenatal education and counselling on nutrition in pregnancy and importance of antenatal care in low-birth-weight reduction cannot be overemphasized.

**Acknowledgement:**

The authors wish to thank all the women who consented to this study. We also acknowledge the contributions of the resident doctors and the nursing staff of the Department of Obstetrics & Gynaecology, EKSUTH, to the success of the study.

**Authors' Contribution:**

All authors contributed to the study conception and design. Conceptualization of the study, material preparation and analysis were performed by IPA. The

first draft of the manuscript was written by BTA and BAO and all authors made critical contributions to the various versions of the manuscript. All authors read and approved the final manuscript.

**Funding:** The study was entirely self-funded.

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