



Ethnic Differences In Birth Weight And Cesarean Deliveries In Zaria, Nigeria

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ABSTRACT

Numerous biological traits have shown significant difference in respect to ethnicity, newborn characteristics and mode of delivery. This study of birth weight was conducted at the Ahmadu Bello University Teaching Hospital, Zaria to check the variation among the three major ethnic groups in Nigeria (Hausa, Igbo and Yoruba). A dataset of 2163 (Hausa n= 1268, Igbo n= 367 and Yoruba n = 528) maternity records covering deliveries for eight years (1996-2004) was used for this study. The result showed that there is a significant difference ($P < 0.001$) in the mean birth of the three ethnic groups. The prevalence of cesarean deliveries among the ethnic groups significantly associated with the Igbo ethnic group having higher percentage (Hausa 7.18%, Igbo 12.33% and Yoruba 6.89%: $\chi^2 = 11.33$, $df = 2$, $P = 0.003$). This study has shown that the Igbo ethnic groups have higher birth weights, which may be the predisposing factor to higher percentage of cesarean deliveries.

Keywords: Birth weight, ethnic, Hausa, Igbo, Yoruba, cesarean delivery, Zaria.

Birth weight is an integral measure of prenatal growth and is regularly used by clinicians and public health workers as an indicator of newborn viability (Tripathy and Gupta, 2005). Significant variabilities in biological traits among different ethnic groups is a well established issue (Stine, 1993). Birth weight has also been observed to express genetic and ethnic differences (Naylor and Myriantopoulos, 1967; Magnus, 1984; Little and Sing, 1984, 1987; Hulseley et al., 1991; Wildschutt et al., 1991; Rauh et al., 2001). Several studies have established significant difference in birth weight among White Americans and African Americans (Rauh et al. 2001), and risk of lower birth weight in African Americans (David Collins, 1997). For example studies have reported differences in birth weight among the Europeans, Asian and the African-Caribbean (Perry et al. 1995). Steer et al. (1995) reported difference in birth weight to lower level of haemoglobin concentration being highly associated with high rates of lower birth weight in some ethnic groups.

This ethnic difference predisposes the ethnic group at a greater disadvantage of having higher rates of ailments associated with lower birth weights. A number of adulthood diseases including type II diabetes, hypertension, cardiovascular diseases, obesity and a host of others have been linked to low birth weight (Lurbe 1996; Barker 1998; Huxley et al. 2000;

Anazawa et al. 2003).

The incidence of cesarean deliveries has increased in recent years (Garg and Ekuma-Nkama, 2004) and this mode of delivery is associated with increased fetal and maternal mortality (Lillford et al., 1990; Smaill, 1992; Lydon-Rochelle, 2000; Garg and Ekuma-Nkama, 2004; Guise et al., 2004). Even though, cesarean deliveries are associated with increased birth weight (Garg and Ekuma-Nkama, 2004) it has been earlier reported that high birth weight is not the only cause of cesarean deliveries, low expression of gene that are concerned with myometrial contraction have been implicated for the failure of parturition to take place (Chien et al. 1997; Tashima et al. 1999; Aguan et al. 2000; Chan et al., 2002).

This study seeks to investigate the existence of ethnic difference in birth weight and cesarean deliveries among the three major ethnic groups (Hausa, Igbo and Yoruba) in Nigeria.

MATERIALS AND METHOD

The present study is based on a data set of 5465 singleton births, which took place at the Department of Obstetrics and Gynaecology, Ahmadu Bello University Teaching Hospital, Zaria between 1996 and 2004. For the purpose of this study 2163 material records were extracted from the maternity register for further investigation, since they could be identified on the basis of their ethnic groups. For mothers the parameters studied include maternal age, ethnic

background, parity and frequency of cesarean delivery and for newborns the birth weight and sex of newborn were obtained.

Statistical Analyses

Data were expressed as mean \pm standard deviation (SD). Student's t-test was used to test for the difference in the means of the birth weights in male and female newborns, for each of the ethnic groups. One way analysis of variance was used to test for significant difference between birth weights in the various maternal ethnic groups, maternal age and parity. Correlation analysis was used to examine the relationship between birth weight and maternal age and parity. Pearson Chi square was used to check for significant association in prevalence of cesarean delivery among the maternal ethnic groups. SigmaStat 2.0 for Windows (SPSS Science, San Rafael, CA) was used for the analysis and the level of significance used was $P < 0.05$.

RESULTS

Table 1 shows the mean maternal age, birth weight and parity within the ethnic groups. The Igbo had the highest mean in maternal age, while the Hausas had the lowest and highest parity with statistically significant difference at $P < 0.001$. The newborn birth weights according to sex are presented in Table 2, the difference in newborn birth weight reached significant difference in the Igbo. The difference within the sex of newborns according to ethnic group showed significant difference at $P < 0.001$ in males and $P < 0.05$ in females. Correlation analysis indicated significant relationship between maternal age and birth weight at $P < 0.001$, while birth weight and parity fail to reach significant relationship (Table 3). Chi square analysis indicates there is significant associated in the prevalence of cesarean delivery and maternal ethnic groups $P = 0.003$.

Table 1: Maternal Age, Birth Weight And Parity According To Ethnic Groups

Ethnic group	N	Mean \pm SD	Range	F	P
Maternal Age (yrs)					
Hausa	1268	26.34 \pm 6.22 ^a	15 - 50	21.86	<0.001
Ibo	365	28.25 \pm 5.84 ^b	18 - 40		
Yoruba	528	27.89 \pm 5.26 ^b	17 - 45		
Birth weight (kg)					
Hausa	1268	2.98 \pm 0.53 ^a	0.95 - 4.00	7.20	<0.001
Ibo	365	3.19 \pm 0.59 ^b	2.00 - 4.30		
Yoruba	528	3.10 \pm 0.52 ^c	1.50 - 4.75		
Parity					
Hausa	1268	3.39 \pm 2.48 ^a	1 - 11	21.58	<0.001
Ibo	365	3.01 \pm 1.90 ^b	1 - 9		
Yoruba	528	2.64 \pm 1.83 ^c	1 - 11		

Means with similar superscripts are the same while means with different superscripts are significantly different

Table 2: Birth Weight (Kg) Of Newborns According To Sex Analyzed With One-Way Analysis Of Variance And Student's T-Test.

	Hausa	Igbo	Yoruba	F	P
Males	3.02 \pm 0.53 ^a (n = 603)	3.30 \pm 0.52 ^b (n = 181)	3.11 \pm 0.45 ^c (n = 266)	21.30	<0.001
Females	2.96 \pm 0.57 ^a (n = 664)	3.06 \pm 0.58 ^b (n = 184)	3.03 \pm 0.52 ^a (n = 262)	3.04	<0.05
T	1.93	4.16	1.89		
P	0.05	<0.001	0.06		

Means with similar superscripts are the same while means with different superscripts are significantly different.

Table 3: Correlation Matrix Of Maternal Age and Parity and Birth Weight (N = 2163).

	Maternal age	Parity	Birth weight
Maternal age	-	0.71 P<0.001	0.20 P<0.001
Parity		-	0.03 P<0.23
Birth weight			-

DISCUSSION AND CONCLUSION

One evident feature in the maternal parameters is the higher maternal age exhibited by the mothers from the Igbo ethnic group. The difference in the mean maternal age between the Hausa and the Igbo mothers is 1.91 years. The results showed significant difference indicating that the Igbo marry later than the Hausa and the Yoruba mothers. Even though, the Hausa mothers have low maternal age, this study revealed that they had the highest parity among the three ethnic groups. The finding from this study agrees with reports in other populations where higher maternal age has been associated with higher newborn birth weight and other somatometrics and adolescent mothers with poor birth outcomes. (Fraser et al., 1995; Botting et al., 1998; Lao and Ho, 1998; Lao and Ho, 2000; Kirchengast and Hartmann 2003).

This ethnic difference did not only stop at the cumulative effect of both sexes of newborns, but was also expressed even when the newborns are separated into their respective sexes. The Igbo newborns were significantly higher both in the males and females at $P < 0.001$ and $P < 0.05$ respectively, when compared with the Hausa and the Yoruba ethnic groups. The effect of sex is not strong when considering the Hausa and Yoruba, even though the males and newborns are heavier, the difference is just marginal ($P = 0.05$ and $P = 0.06$, respectively).

The prevalence of cesarean deliveries are highly associated with higher birth weights (Kirchengast and Hartmann, 2003; Garg and Ekuma-Nkama, 2004). The results of this study also agree with these reports. The higher prevalence of cesarean deliveries in the Igbo ethnic group may be associated with maternal age of the Igbo mothers. This situation even though beneficial for the survival and well being of the newborn and in adult life (Richards et al.,

2001; Hediger, 2002), it poses a greater incidence of mortality for mothers and subsequent pregnancies as recently reported (Guisse et al., 2004; Garg and Ekuma-Nkama, 2004). The authors of this study also know that higher birth weight is not the only cause of cesarean deliveries; recent molecular studies have shown that labour fail to progress as a result of low expression of genes that regulate the process of parturition (Chien et al., 1997; Aguan et al., 2000; Chan et al., 2002). It seems the major reasons for the higher prevalence of cesarean delivery in the Igbo maternal group is the higher birth weight seen in their newborns.

In conclusion the study revealed a strong evidence of the difference between birth weights in the ethnic groups studied. One of the factors that may be the reason for this variation is the difference also associated with maternal age of the studied population. The Hausa ethnic group believes in early marriage, many of them get married while they are adolescents, so this could be the main reason for the lower birth weight in this group. On the other hand, the Igbo ethnic group, traditionally believe that a man must be well 'established' before getting married and the women too are discouraged from marrying early, so the net effect is that a woman marries a little late. The Yoruba situation is a little different since this group place emphasis on western education, so the delay may be a result of school attendance.

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