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The Effects of Socio-Biological Factors on Birthweights of Nigerian Full-Size, Live-born Infants

O O FAKEYE* AND O O ADETORO**

SUMMARY

Fakeye O O and Adetoro O O. The Effects of Socio-biological Factors on Birthweights of Nigerian Full-size, Live-born Infants. Nigerian Journal of Paediatrics 1989; 15: O. Birthweight data on 3922 consecutive, full-size term, singleton, livebirths at the University of Ilorin Teaching Hospital were obtained from the hospital records and the influence of biological factors: sex of the infant, maternal age, parity, height and weight was assessed by an analysis of the variations in mean birthweights. Male infants (3269gm) weighed more than female infants (3175gm). Mean birthweight was lowest with maternal age under 20, increased sharply between ages 20–25, and plateaued thereafter. Mean birthweight was lowest for first birth, increased over successive parity 2 through 7 and declined at higher parity. Increasing maternal height and weight during pregnancy had positive influence on birthweight.

Introduction

BIRTHWEIGHT is the best known parameter for assessing intrauterine growth and development[1] which may be influenced by maternal age, parity, height and weight, and the sex of the foetus.[2—4] This paper examines these variables and their effects on the mean birthweights of Nigerian term infants.

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Materials and Methods

The material used in this study consisted of birthweight data obtained from 3922 consecutive, full size (birthweight ⩾2.5kg), singleton, liverborn, term infants delivered over a 6–month period (January – June, 1983), at the Maternity Wing of the University of Ilorin Teaching Hospital (UITH), Ilorin. The UITH serves a relatively homogeneous ethnic population, mainly of low social groups, in the Ilorin area of Kwara State (pop 0.5 million).

The number and proportions of complete data for each parameter are as follows: age, 3792 (96.7%); parity, 3838 (97.8%); weight, 3245 (82.7%); height, 2935 (74.8%). Weight at last visit prior to delivery was used. Each parameter was subdivided, and the variation of mean birthweight within subgroups of age, parity, height, weight and sex of infants were determined and compared.

Data on twin births, low birthweight (<2.5kg), and stillbirths, were excluded from this analysis.

Results

Sex ratio at birth was M:F, 1.06:1. The mean birthweight for male infants was 3269gm, and 3175gm for females.

The maternal characteristics of full-term, liveborn deliveries are shown in

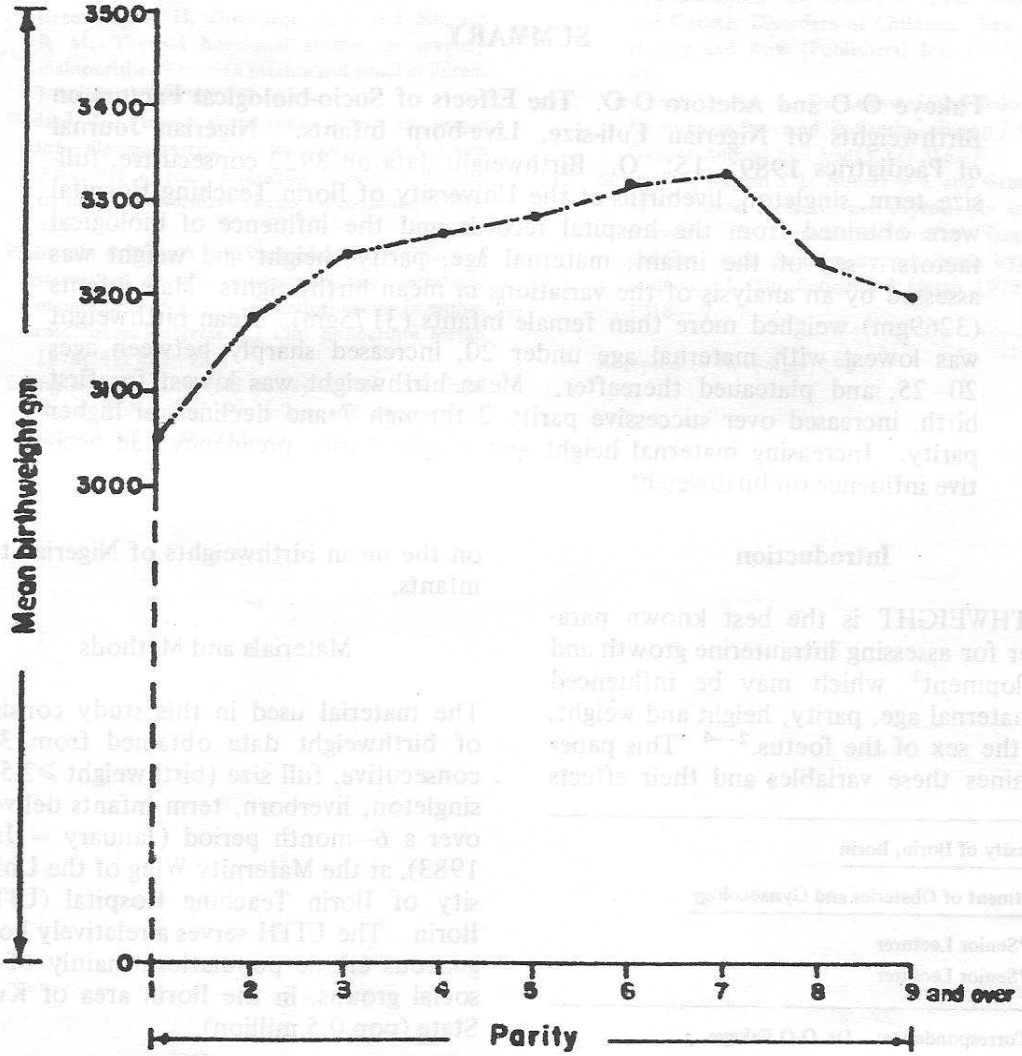

Fig. 1. Effect of Parity on Mean Birthweights

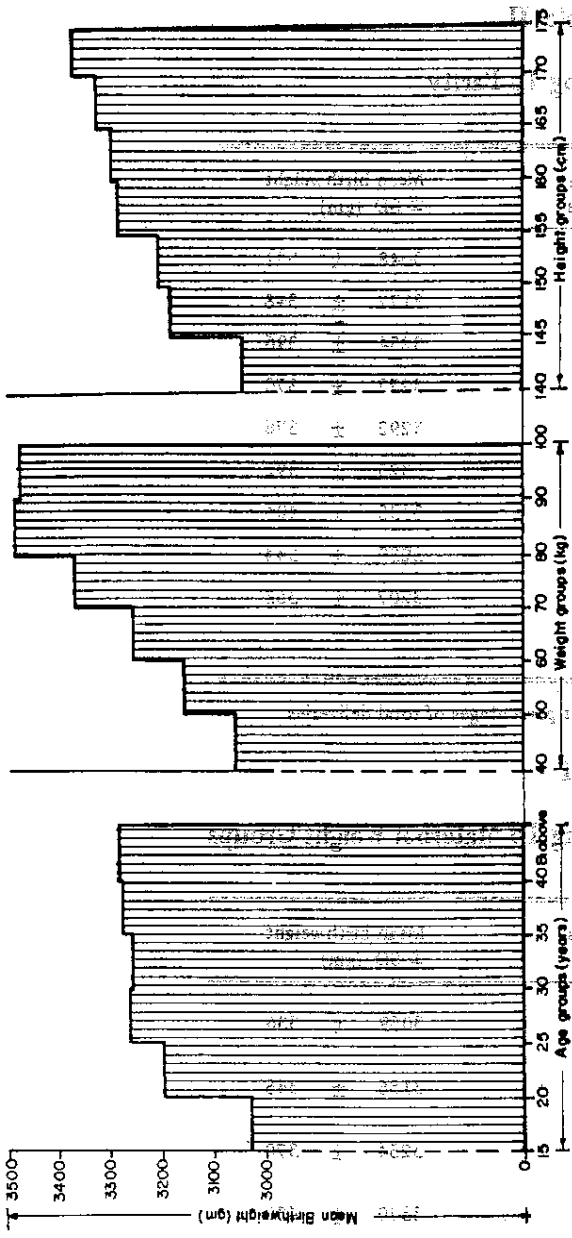

Fig. 2. Bar Diagrams Showing Variations in Mean Birthweights within Sub-divisions of Maternal Age, Weight and Height

Tables I–IV. Teenage deliveries occurred in 11.8% while mothers of para 5 and above accounted for 29.5%. The underweight (< 50kg) and overweight (⩾ 80kg) mothers constituted 5.2% and 4.2% respectively, while 10.5% of the women were short statured (< 150cm).

Figure 1 illustrates the variation of mean birthweights with parity. The first-borns show the lowest birthweights. A sharp rise in mean birthweight is observed with birthranks 2 and 3 followed by a gradual rise over ranks 4 and 5, then a plateau at ranks 6 and 7. A fall in mean birthweight at ranks 8 and 9 is observed.

Figure 2 illustrates the relationship between mean birthweight and maternal age, weight during pregnancy and height. In relation to age, birthweights of infants of under-20 mothers was lowest, followed by a mean rise of 163gm in the age subgroups between 25–45 years.

A consistent, stepwise rise in mean birthweight with maternal weight is observed, reaching a maximum effect at body weight 90kg and above. Similarly, with regards to height, there is a gradual rise in mean birthweight in relation to increasing maternal height.

Table I

Mean Birthweights According To Maternal Age Groups

Age (Yrs)	No of Infants	Mean birthweights ± SD (gm)
15 – 19	449(11.4)*	3033 ± 330
20 – 24	1,077(27.5)	3196 ± 370
25 – 29	1,251(31.9)	3266 ± 380
30 – 34	796(20.3)	3263 ± 370
35 – 39	148(3.8)	3278 ± 390
40 and over	71(1.8)	3285 ± 338
Unknown	130(3.3)	

*Figures in parenthesis are percentages of the total number of deliveries

Table II

Mean Birthweights According To Parity

Parity	No of Infants	Mean birthweight ± SD (gm)
1	631(16.1)*	3048 ± 341
2	714(18.2)	3177 ± 348
3	694(17.7)	3254 ± 396
4	665(17.0)	3272 ± 370
5	498(12.7)	3292 ± 376
6	354(9.0)	3325 ± 392
7	178(4.5)	3335 ± 404
8	61(1.6)	3239 ± 344
9 and over	43(1.1)	3207 ± 353
Unknown	84(2.1)	

*Figures in parenthesis represent percentages of total deliveries.

Table III

Mean Birthweights According To Maternal Weight Groups

Weight (kg)	No of Infants	Mean birthweight ± SD (gm)
40 – 49	205(5.2)*	3059 ± 336
50 – 59	1,215(31.0)	3156 ± 345
60 – 69	1,238(31.6)	3254 ± 370
70 – 79	421(10.7)	3370 ± 430
80 – 89	125(3.2)	3479 ± 412
90 – 99	41(1.0)	3471 ± 357
Unknown	677(17.3)	

*Figures in parenthesis represent percentages of total deliveries.

Table IV

Mean Birthweights According To Maternal Heigtt

Table IV

Mean Birthweights According To Maternal Height Groups

Height (cm)	No of Infants	Mean birthweight ± SD (gm)
140 – 144	81(2.1)*	3042 ± 345
145 – 149	331(8.4)	3178 ± 338
150 – 154	827(21.1)	3201 ± 355
155 – 159	807(20.6)	3280 ± 368
160 – 164	567(14.4)	3287 ± 377
165 – 169	215(5.5)	3317 ± 432
170 – 174	107(2.7)	3366 ± 402
Unknown	987(25.2)	

*Figures in parenthesis represent percentages of total deliveries.

Discussior

There have been several studies of mean birthweight of Nigerian infants.[5—7] None of these studies has however, focussed on the biological determinants of birthweights. The design of this study which excludes twins, stillbirths and low birthweight infants would ensure better understanding of the contribution of specific biological factors to birthweight.

There are conflicting reports in the literature regarding the effect of maternal age on birthweight. Dougherty and Jones[4] and Oduntan, Odunlami and Ayeni[8] did not find significant correlation between maternal age and mean birthweight, among British and Nigerian infants respectively. Boutaleb[9] from Morocco, reported that birthweight decreased when maternal age was below 20 years or above 30 which is largely in agreement with our findings. The reduced birth weight in mothers less than 20 years would suggest the importance of maternal nutritional status during pregnancy. Teenage pregnancy is associated with the double burden of maintaining optimal growth for both mother and

foetus. Hence, early marriages should be discouraged.

Most observers agree that parity has a strong effect on birthweight.[2] The effect of parity on birthweight observed in this study supports a curvilinear relationship where there is a tendency for the birthweight to increase gradually with parity but showing diminution with advancing parity (8 and above). Roberts and Tanner,[10] and Salber[11] made similar observations among Tanganyikan and south African Bantus respectively. Common to the Bantus and Nigerians in this survey, are the large proportions, over 20%, of grandmultiparous women. In contrast, high parity is uncommon in caucasians[4 12] and a fall in mean birthweight with increasing birth order is not observed. It is suggested that repeated pregnancies is associated with nutritional deficiency in the mother, and consequent reduction in intrauterine growth potential for the infant There is further need to discourage high birth ranks among Nigerians by a more active campaign for the adoption of family planning methods.

The possible effect of maternal height and weight on birthweight is more inconclusive since both factors are inter-related. Boutaleb[9] and Remankutty[13] observed that birthweight often correlated better with maternal wieght, than with height. The results presented here support some earlier findings[4 9] where there was a tendency for the birthweith to increase with height and weight during pregnancy. Taller, heavier mothers often bear larger infants than do smaller, lighter mothers.[14] There is also the well the well known association of maternal obesity to gestational diabetes and large infants.[15] On the other hand, familial predisposition may largely determine the influence of height on birthweight.[14]

Other social and environmental factors like attendances at prenatal clinics,[16] anaemia,[17] smoking habits[18] and malarial chemoprophylaxis[19] can also affect birthweight. The women in this study were all non-smokers, the majority averaged 4–7 attendances at prenatal clinic, and were maintained on iron supplementation, and antimalarial chemoprophylaxis.

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