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Maternal socio-demographic characteristics as correlates of newborn birth weight in urban Abeokuta, Nigeria

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Abstract

The weight of a baby at birth is the most commonly used outcome measure of pregnancy, frequently examined in epidemiological studies, and is widely associated with mortality and morbidity risks of infants. The aim of this study was to examine the influence of maternal socio-demographic characteristics on infant birth weight and particularly low birth weight. This was a cross-sectional study of 1,024 purposively selected pregnant mothers who delivered in four randomly selected antenatal clinics in urban Abeokuta, Nigeria. Physical examination, clinical profile, height and weight measurements before and immediately after delivery were recorded. Data were analysed using descriptive statistics and chi-square test of significance. Primiparous and multiparous mothers had 17.80% and 4.10% low birth weight (LBW) incidences, respectively. The relationship between maternal age and LBW, and that of parity and LBW were both statistically significant (p< 0.001). Mothers below 150cm height delivered babies with the lowest mean birth weight (2.33±0.17kg) while taller mothers had heavier babies. Mothers in the very low and low-income categories were associated with a higher incidence of LBW babies (27.92% and 25.0% respectively), in comparison with those mothers with higher average monthly income. Illiterate mothers also had the highest incidence of LBW (18.36%). Maternal parity, age, height, level of formal education, occupation, average monthly income and past obstetric history were found to be significant for LBW (p<0.001). Primiparous mothers in this study were found to be at particular risk of delivering LBW babies. Mothers with past history of previous LBW babies, abortions and perinatal death delivered more LBW newborns than those without such experiences.

Keywords: Low birth weight, maternal age, parity, monthly income, past obstetric history

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Introduction

Birth weight (BW) is the most commonly used outcome measure of pregnancy frequently examined in epidemiological studies, and is widely associated with mortality and morbidity risks of infants [1]. It represents the final expression of a complex interaction between many processes and events [2].

The records of 615 pregnant women over the years 1966 to 1975 at Osegere, a typical village in western Nigeria were examined and their birth weights correlated very strongly with maternal height, weight at 20 weeks and weight gain after 20 weeks of pregnancy [3]. Similarly, correlations between BW and age of the mother, parity and gestational age have been earlier reported among Tanzanian women [4].

The World Health Organization (WHO) defined low birth weight (LBW) as BW below 2,500gm [5]. In India 85% of neonatal mortality is associated with LBW, 87% in Guatemala and 56% in North Acrot [6]. It is estimated worldwide that 25 million LBW infants were born in 1990, making up to 18% of all live births, 90% of which occurs in developing countries [7]. Among industrialized countries, low birth weight rates may reflect differences in definitions used for reporting births, such as cut-offs for

registering births and birth weight [8]. Country estimates of low birth weight incidence for countries with a population above 300,000 were weighted by the annual number of births for each country, as estimated by the United Nations (UN) Population Division for the year 2000, to calculate the regional and global estimates for UN geographical regions [9].

Low birth weight babies are at the greatest risk in early childhood and BW below 2.5kg reflects intrauterine malnutrition involving micro-nutrient deficiencies, infections such as malaria and syphilis, and maternal malnutrition. This practical cut-off for international comparison is based on epidemiological observations that infants weighing less than 2,500g are approximately 20 times more likely to die than heavier babies [10]. More common in developing than developed countries, a birth weight below 2,500g contributes to a range of poor health outcomes. While low birth weight continues to be useful in focusing attention on a healthy start to independent life, it has also become increasingly evident that the cut-off value of 2,500g may not be appropriate for all settings. Some countries with high incidence of low birth weight do not necessarily have high mortality rates, as for example in Sri Lanka [11].

In developing countries, it is estimated that more than half (58%) of the babies are not weighed at birth, with this proportion being highest in South Asia (74%) and sub-Saharan Africa (65%) respectively. The highest proportions of infants who are weighed are in Latin America and the Caribbean (only 17% not weighed) and in Central and Eastern Europe and the Commonwealth of Independent States (21% not weighed). These data indicate that not all babies born with the assistance of skilled health personnel are weighed or have their weights recorded. For comparison, 58% of babies in the developing world are born with a skilled attendant at delivery while on the whole; only 42% are weighed [12].

The incidence of LBW is a powerful indicator of infant survival, and indirectly of the mother's nutritional status [13]. In Nigeria, the average prevalence of LBW is estimated to be about 16%, with a range of 6-21% [14]. LBW newborns in the low socio-economic groups of developing countries are major problems for public health services. The immediate consequences are higher morbidity and mortality rates in the perinatal and neonatal periods [15, 16]. The late consequences may include prolonged impairment of immunological defense mechanisms [17], and neurological sequelae [18], which interfere with the normal development of the child and, on a national level, are serious obstacles to development. Maternal morbidity during pregnancy is highly prevalent in the low socio-economic groups [19].

Studying the determinants of birth weight is important for both public and clinical perspectives. Such information would be crucial in understanding the secular trends and changes in the socio-economic status of people; which could influence the BW of infants. In this regard, the present study was designed to examine the socio-demographic variables affecting the BW of the newborn in urban Abeokuta, Nigeria, information regarding which is lacking.

Methodology

This cross-sectional study involved 1,024 purposively selected pregnant mothers who delivered in four randomly selected health facilities between January and November, 2013 in urban Abeokuta, Nigeria. The population for the study consisted of pregnant mothers attending antenatal clinics in the health facilities in urban Abeokuta. Participants were recruited as they became available, after signing the consent form following due explanation of the purpose of the study. Complete abdominal examination, clinical profile, height, blood pressure and weight measurements before and immediately after delivery were carried out. Newborns were weighed and the general physical conditions assessed immediately following delivery. Infants weighing below 2.5kg were recorded as low birth weight (LBW) babies.

Analysis was carried out using descriptive statistics and chi-square test of significance was employed in testing for association between the variables. The level of significance was set at 0.05.

Results

The mean birth weight of the babies was 2.64±0.312kg. The relationship between maternal age and parity with newborn BW is shown in Table 1. The highest number of LBW babies (102) was delivered by mothers below the age of 20 years. Also, primiparous mothers recorded 17.80% LBW incidence as against 4.10% observed in the multiparous category. The relationship between maternal age and LBW, and that of parity and LBW were both statistically significant ($p< 0.001$).

Mothers below 150cm height delivered babies with the lowest mean birth weight (2.33±0.17kg), followed by mothers 150 to 154 cm in height (2.47±0.19) while taller mothers had heavier babies (Table 2).

Table 3 shows the relationship between BW of the new born and maternal socio-economic status. LBW incidence of 14.84% was recorded for mothers who engaged in menial jobs/petty trading. Mothers in the low and very low-income categories were associated with a higher number and incidence of LBW babies (27.92% and

25.0% respectively), in comparison with those mothers with higher average monthly income. Illiterate mothers also had the highest incidence of LBW (18.36%) as against 1.17% recorded for the educated ones.

Table 1. *Maternal age and parity in relation to newborn birth weight*

Maternal age (years)	Number of mothers	Number of LBW newborns	Incidence of LBW %	p- value
< 20	300	102	9.96	
21-25	216	92	8.98	
26-29	232	42	4.10	< 0.001
30-34	196	26	2.53	
> 35	80	22	2.15	
Maternal parity				
1	428	182	17.80	
2	352	88	8.60	
3	180	46	4.49	< 0.001
>4	64	42	4.10	

Table 2. *Maternal height and infant birth weight*

Maternal Height (cm)	Frequency (n)	Mean (kg)	S.D	Range	F– value	p – value
< 150	642	2.33	0.17	0.60		
150 – 154	310	2.47	0.19	0.80		
155 - 159	0	0.00	0.00	0.00		
160 – 164	54	2.84	0.35	0.40	54.68	0.000
165 – 169	0	0.00	0.00	0.00		
≥170	18	2.93	0.54	0.30		

Table 3. *Maternal socio-economic status and infant birth weight*

Maternal education		Number of mothers/ newborns	Number of LBW newborns	LBW incidence (%)	p-value
Illiterate mothers		300	188	18.36	
Primary/ junior secondary		220	140	13.67	
Senior secondary/ tertiary		154	12	1.17	
Maternal occupation					<0.001
Full time housewife		162	146	14.26	
Menial jobs/ petty trading		166	152	14.84	
Civil servants		22	4	0.39	
Maternal income category	Monthly income (₦)	Number of mothers/newborns	Number of LBW newborns	LBW incidence %	p-value
Very low	<5,000	316	286	27.92	
Low	5,001-15,000	268	256	25.0	
Medium	15,001-25,000	248	74	7.22	< 0.01
High	25,001-50,000	192	26	2.54	

LBW = low birth weight; ₦ = Naira

Table 4. *Past obstetric history and birth weight.*

Past obstetric history	Number of mothers/ ewborns	Number of LBW newborns	LBW incidence %	p-value
Still births	68	46	4.49	
Abortion	132	104	10.16	
Perinatal mortality	108	78	7.62	<0.001
Previous LBW	208	194	18.95	
IUGR	166	140	13.67	
Normal deliveries	342	60	5.86	

IUGR= Intrauterine growth retardation; LBW = low birth weight

A statistically significant relationship was found when mothers with previous history of still births, abortions and other forms of poor pregnancy outcome like LBW infants, perinatal mortality and intrauterine growth retardation (IUGR) were compared with mothers without such history (Table 4).

Discussion

Low birth weight (LBW) is a major public health problem due to its association with high morbidity and mortality of infants. Newborn mortality and disease are directly related to birth weight and insufficient or excess weight at birth is always accompanied by an increase of these risk factors.

The findings from this study indicated that several maternal parameters (age, parity, height, occupation, level of formal education and socio-economic status) are related to birth weight; and primiparous mothers were at risk of delivering LBW babies. The illiterate or poorly educated pregnant mothers delivered a greater number of LBW babies and this conforms to results from earlier studies [20-23]. The fact that better educated pregnant mothers delivered lesser number of LBW newborns may be due to their increased awareness as regards available medical services which influenced their health seeking-behaviour and nutritional status.

Similar to other previous studies [24-26], this present study demonstrated that pregnant mothers who engaged in menial jobs and petty trading delivered more LBW babies than others. Maternal average monthly income was observed to influence newborn BW, as mothers who earn higher incomes recorded a lower LBW incidence. This is in line with observations from previous studies by earlier researchers [20, 22, and 27].

Maternal age influences the birth weight of infants [23, 28]. The findings in this study indicated that the number of LBW newborns in older mothers was significantly lower than that from mothers 20 years of age and below. Incidence of LBW in this study decreased with increasing maternal age, which agrees with the findings other researchers [23, 29]. Similarly, mothers with past history of previous LBW deliveries, abortions and perinatal death were observed to deliver more LBW newborns than those without such experiences [30].

Conclusion

The present study indicated that maternal age, parity, height, occupation, level of formal education and socio-economic status are associated with birth weight; primiparous mothers were at risk of delivering LBW babies; and mothers with past history of previous LBW babies, abortions and perinatal death delivered more LBW newborns than those without such experiences. The challenge of addressing this lingering problem undoubtedly deserves an urgent attention by the concerned authorities.

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