

# PREMATURITY IN NEWBORNS IN URBAN AND RURAL GENERAL HOSPITALS IN LAGOS STATE: A COMPARATIVE STUDY

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## ABSTRACT

### BACKGROUND:

*Preterm deliveries occur in millions of pregnancies worldwide and Nigeria has one of the highest numbers of preterm births. They are contributors to childhood mortality, morbidity and complications in later life of the child.*

### AIM:

*This study was aimed at describing and comparing prematurity in newborns in urban and rural health facilities in Lagos state.*

### METHODS:

*It was a descriptive comparative study involving 3 urban and 3 rural hospitals in Lagos State. Data was obtained using interviewer administered questionnaire. Information obtained included mothers' features, weight and morbidity patterns of the newborns.*

### RESULTS:

*Mothers who lacked formal education were more in the rural hospitals than urban hospitals. Preterm babies in urban areas had mothers comparatively older than those in the rural hospitals. Low birth weight occurred in 68.8% of the babies born with 1.9% of them being extreme low birth weight. Illness was diagnosed in 58.8% of the babies with more babies diagnosed in urban than in rural health facilities. However mortality was higher among infants in rural hospitals than those in urban hospitals.*

### CONCLUSION:

*Preterm babies in rural and urban facilities differ in respect to mortality rate and their mothers in terms of educational status. There needs to be further research into prematurity in newborns and assessment of facilities for newborn care in rural areas.*

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## INTRODUCTION

Preterm babies are those born after a shorter gestational age than normal.<sup>1</sup> Preterm babies can be divided into those born between 33-37 weeks as moderate preterm, those between 28-32 weeks as very preterm and those born before 28 weeks as extreme preterm.<sup>2</sup>

Prematurity is a global issue with no part of the world spared. About 5-18% of all births worldwide are considered preterm.<sup>3</sup> The developing world however has a disproportionate percentage of these births with over 60% of preterm births occurring in Africa and South Asia.<sup>3</sup>

The state of newborn health in Nigeria is of great concern as neonatal mortality rate is put at 40/1000 live births with preterm causes contributing about 30% to this rate.<sup>4</sup> Out of the 241,000 deaths that occur of neonates in Nigeria, half are said to be due to preterm causes<sup>5</sup>

Preterm births can be spontaneous when preterm labour occurs unaided or indicated if they occur due to assisted delivery or caesarean section for conditions in the mother or in the child. Several factors have been associated with preterm delivery. Factors that have been associated with preterm delivery include lifestyle factors in the mother,

neighbourhood characteristics, exposures in the environment, treatments for infertility and inherited factors. It has also been associated with reduced socioeconomic conditions and ethnicity where ethnicity is associated with economic disadvantage.<sup>2</sup> Age of mothers, height and previous history of preterm delivery are other maternal factors postulated as important in the occurrence of preterm births.<sup>6</sup>

Preterm infants suffer a wide range of complications.<sup>7</sup> Problems common among preterm infants include apnoea, respiratory distress syndrome, congenital abnormalities, hyperbilirubinaemia resulting in jaundice and retinopathy of prematurity.<sup>8</sup> It also takes its toll on family, community and healthcare resources. The annual economic burden associated with preterm deliveries in the United States is estimated to be about 20 billion dollars.<sup>2</sup>

Despite the public health importance of preterm births, there is paucity of data on conditions of premature infants and even fewer on those born in rural areas. It is important to compare rural and urban preterm neonates as it has been postulated that rural-urban differences influence the outcomes of preterm births.<sup>9</sup>

The aim of this study was to describe and compare preterm neonates in urban and rural general hospitals in Lagos State.

## **METHODOLOGY**

The study took place in Lagos State, one of the states with the largest population in Nigeria.<sup>10</sup> There are 18 public urban General Hospitals and six rural general hospitals in Lagos. It was a comparative cross sectional study. The study population consisted of premature infants in 3 urban and 3 rural General Hospitals in Lagos State. A total of 154 babies were part of the study, 69 in rural hospitals and 85 in urban General Hospitals respectively. Participant hospitals were selected by simple random sampling. Participants were

purposively recruited into the study until sample size was attained. Data collection tool consisted of a questionnaire. Questionnaire was pretested at a separate General Hospital from those used for the study.

Ethical approval was obtained from the Research and Ethics committee of the Lagos University Teaching Hospital. Consent was obtained from the mothers of the neonates.

Information obtained included age, marital status, and religion of mothers. Status of weight and medical conditions of neonates were also obtained. Statistical analysis was done using Epi-Info and Win-Pepi.

## **RESULTS**

Of the 154 babies studied, 5.8% (9) of them were born to mothers less than 20 years and the average age of the mothers was 29+/-5. Mothers of 85.7%(132) of the babies were married. There was no significant difference between the marital status of the urban and rural mothers. In 7.1% (11) of the cases the mothers had no formal education with a significantly higher proportion of these being in the rural than in the urban areas.

Overall 45% (66) of the preterm infants were male while 55% (82) were female. However there were more male offspring born preterm in the rural hospitals and more females born preterm in the urban hospitals.

The babies were categorized by their weights into extreme low birth weight, very low birth weight, moderate low birth weight and normal weight. The normal weight babies constituted 31.2% (48) of the total babies born preterm. ELBW babies accounted for 1.9% (3), 26% (40) were VLBW and 40.9%(63) MLBW.

Preterm babies born to urban mothers were more significantly diagnosed with illness and admitted than rural babies. Overall the most common diagnosis was prematurity. Rural preterm infants

had higher diagnosis of respiratory illness and sepsis than urban babies. Urban preterm babies had more diagnosis than those found in rural areas. At the time of the study, 11% (17) of the babies had

experienced mortality. Higher rate of mortality was found in the preterm babies in the rural hospital than in those in the urban hospitals.

**Table 1: Demographic Characteristics of mothers of the preterm babies**

Variables	Urban Freq.(%)	Rural Freq.(%)	Total Freq.(%)	Chi- square	
<b>Age</b>					
20yrs and less	5(5.9)	4(5.8)	9(5.8)	<b>X<sup>2</sup></b>	3.246
21 – 30yrs	38(44.7)	37(53.6)	75(48.7)	<b>Df</b>	3
31 – 40yrs	38(40.0)	27(37.9)	65(39.1)	<b>P-value</b>	0.829
Above 40yrs	4(4.7)	1(1.4)	5(3.2)		
<b>Total</b>	<b>85(100.0)</b>	<b>69(100.0)</b>	<b>154(100.0)</b>		
<b>Marital Status</b>					
Single	10(11.8)	8(11.6)	18(11.7)	<b>X<sup>2</sup></b>	1.393
Married	73(85.9)	59(85.5)	132(85.7)	<b>Df</b>	3
Divorced	1(1.2)	2(2.9)	3(1.9)	<b>P-value</b>	0.8385*
Widowed	1(1.2)	0(0.0)	1(0.6)		
<b>Total</b>	<b>85(100.0)</b>	<b>69(100.0)</b>	<b>154(100.0)</b>		
<b>Education</b>					
No formal education	2(2.4)	9(13.0)	11(7.1)	<b>X<sup>2</sup></b>	6.732
Primary education	8(9.4)	6(8.7)	14(9.1)	<b>Df</b>	3
Secondary education	43(50.6)	29(42.0)	72(46.8)	<b>P-value</b>	0.0846*
Tertiary education	32(37.6)	25(36.2)	57(37.0)		
<b>Total</b>	<b>85(100.0)</b>	<b>69(100.0)</b>	<b>154(100.0)</b>		
<b>Religion</b>					
Christianity	55(64.7)	49(82.6)	112(72.7)	<b>X<sup>2</sup></b>	6.378
Islam	30(35.3)	11(15.9)	41(26.6)	<b>Df</b>	2
Traditional	0(0.0)	1(1.4)	1(0.6)	<b>P-value</b>	0.0250*2
<b>Total</b>	<b>85(100.0)</b>	<b>69(100.0)</b>	<b>154(100.0)</b>		
<b>Ethnicity</b>					
Yoruba	50(58.8)	40(58.0)	90(58.4)	<b>X<sup>2</sup></b>	0.122
Igbo	12(14.1)	9(13.0)	21(13.6)	<b>Df</b>	3
Hausa	3(3.5)	3(4.3)	6(3.9)	<b>P-value</b>	1.000*
Others	20(23.5)	17(24.6)	37(24.0)		
<b>Total</b>	<b>85(100.0)</b>	<b>69(100.0)</b>	<b>154(100.0)</b>		

**Table 2: Characteristics of preterm newborns**

	<b>Urban Freq.(%)</b>	<b>Rural Freq.(%)</b>	<b>Total Freq.(%)</b>		
<b>Sex</b>					
Male	28(33.3)	38(58.5)	66(44.3)	<b>X<sup>2</sup></b>	9.81
Female	55(65.5)	27(41.5)	82(55.0)	<b>Df</b>	2
<b>Total</b>	<b>84(100.0)</b>	<b>65(100.0)</b>	<b>149(100.0)</b>	<b>P-value</b>	0.007
<b>Birth weight</b>					
1(ELBW)	1(1.2)	2(2.9)	3(1.9)	<b>X<sup>2</sup></b>	4.095
2(VLBW)	27(31.8)	13(18.8)	40(26.0)	<b>Df</b>	3
3(MLBW)	34(40.0)	29(42.0)	63(40.9)	<b>P-value</b>	0.227*
4norma weight	23(27.0)	25(36.3)	48(31.2)		
<b>Total</b>	<b>85(100.0)</b>	<b>69(100.0)</b>	<b>154(100.0)</b>		
<b>Was child ill</b>					
Yes	55(64.7)	35(50.7)	90(58.4)	<b>X<sup>2</sup></b>	7.27
No	30(35.3)	34(49.3)	70(41.6)	<b>Df</b>	1
<b>Total</b>	<b>85(100.0)</b>	<b>69(100.0)</b>	<b>154(100.0)</b>	<b>P-value</b>	0.013*
<b>If ill was</b>					
Child treated and sent home	1(1.8)	8(22.9)	9(10.0)	<b>X<sup>2</sup></b>	28.682
Admitted and treated	53(96.4)	20(57.1)	73(81.1)	<b>Df</b>	3
Treated at home	1(1.8)	0(0.0)	1(1.1)	<b>P-value</b>	<0.001
No need for treatment	0(0.0)	7(20.0)	7(7.8)		
<b>Total</b>	<b>55(100.0)</b>	<b>35(100.0)</b>	<b>90(100.0)</b>		
<b>Type of illness</b>					
Birth Asphyxia/ Respiratory	6(10.9)	15(42.9)	21(20.8)	<b>X<sup>2</sup></b>	19.172
Jaundice	17(30.9)	1(2.9)	18(20.0)	<b>Df</b>	4
Prematurity low birth weight	29(52.7)	15(42.9)	44(48.9)	<b>P-value</b>	<0.001
Sepsis / Fever	3(5.5)	(11.4)4	7(7.8)		
<b>Total</b>	<b>55(100.0)</b>	<b>35(100.0)</b>	<b>90(100.0)</b>		
<b>State of child</b>					
Alive and well	56(65.9)	44(63.8)	100(65)	<b>X<sup>2</sup></b>	8.087
Alive and ill	25(29.4)	12(17.4)	37(24)	<b>df</b>	2
Departed	4(4.7)	13(18.8)	17(11.0)	<b>P-value</b>	0.018
<b>Total</b>	<b>85(100.0)</b>	<b>69(100.0)</b>	<b>154(100.0)</b>		

## DISCUSSION

The most important issue concerning preterm birth is its impact on neonatal outcomes. In this study, the proportion of infants with birth weight more than 2.5kg was 31.2%(48). This means that 68.8%(106) of preterm babies involved in this study were low birth weight. This percentage is higher than the national average of babies born in Nigeria as low birth weight which is estimated to be 14%.<sup>5</sup> This suggests that preterm births is associated with occurrence of low birth weight in Nigeria.

The common clinical conditions found in the preterm babies in this study are jaundice, prematurity, sepsis and respiratory problems. Respiratory conditions were commonest in rural and prematurity the commonest diagnosis in urban hospitals. A case control study in United Kingdom gave the most common clinical conditions found in preterm babies as jaundice, hypoglycaemia, respiratory distress syndrome and hypothermia.<sup>13</sup> A study done in India gave common complications in preterm neonates as respiratory distress syndrome, jaundice, sepsis and necrotizing enterocolitis.<sup>14</sup> A study done in Ghana had the most common clinical conditions as prematurity and respiratory illness.<sup>15</sup> There are thus similar conditions affecting premature babies in this study as have been documented in other parts of the world.

The total percentage of preterm babies diagnosed as ill was 54%. This is comparable to a study done in Ghana that estimated that 57.1% of preterm infants were admitted with varying conditions.<sup>15</sup> This suggest that more than half of preterm babies are likely to be ill. This implies great costs to health institutions and families due to the relative high cost of treating preterm infants. This portends that there may be a diversion of funds in the country to treating preterm infants and implies dire consequences for funding of preventive measures which are more cost effective.

In this study a total of 11% of the preterm babies experienced mortality. This was found to be in 18.8% and 4.7% of the babies born in rural and urban hospitals respectively. There was thus a significantly higher mortality rate in rural born

compared with urban born preterm babies. This may not be unconnected with the likelihood that there is relative lack of facilities for care of preterm babies in rural hospitals compared with urban hospitals. These values are similar to those found in a study in Australia that found a higher rate of mortality of preterm infants in rural compared with urban areas (15.3% versus 13.4%).<sup>16</sup> This may suggest that generally urban preterm infants experience lower mortality rates than rural preterm infants but this needs more studies for conclusion to be reached.

The overall rate is lower than estimates from a study in Ghana (265.9 deaths per 1000 births).<sup>15</sup> It is however higher than that found in a study in United kingdom with 2.4 deaths per 1000 births.<sup>17</sup> This lower mortality rate may be due not just to better facilities for neonatal care but the probably better socioeconomic status in United Kingdom compared with Nigeria.

Global estimates for mortality in preterm births has been given as 1 million deaths in 15 million births which translates to 6.67%.<sup>3</sup> The difference between the global estimates and the statistics from this study may be due to the fact that the global estimates include developed countries who do not only have a lower incidence of preterm births but more facilities, personnel and funding for care of preterm infants.

Age and other sociodemographic factors are among factors considered in association with preterm deliveries. Extremes of age were found to be associated with preterm deliveries. The mothers aged less than 20 years old were about 5.85% of the respondents and approximately equal proportions in respondents in urban and rural hospitals.

These values were less than that obtained in a study done in Calabar that gave proportions of those under 20 years as 12%.<sup>19</sup> This low level of teenagers in this study may not be a true reflection of preterm deliveries among teenagers but rather that stigma and other factors may hinder use of hospitals.

This higher level in Calabar may be due to the fact that the study was carried out in a tertiary institution located in an urban area where teenagers will seek

care more than in a rural area because of better access and awareness. Tertiary hospitals may also have more teenagers delivering due to referrals. This agrees with a study done in Australia that found rural mothers more likely to be teenagers when compared to their urban counterparts and more mature mothers in the urban.<sup>17</sup>

Mothers lacking formal education were about 7% of the respondents. The proportions in rural hospital attending respondents at 13% were much higher than those in urban at less than 3%. This low level of formal education among women who delivered in rural hospitals is truly reflective of the educational status of women in rural areas in Lagos and bodes ponderous public health implications. Poor maternal educational status is associated with poor health indices.<sup>1</sup>

The implication of the mortality rate in this is profound if it reflects the situation in Nigeria generally. It means that millennium developmental goal 4 (reduce child mortality) needs more work to be done if it is to be achievable. It also has implications for MDG 5 (improve maternal health) as women who have lost a child may try to compensate by getting another one and thus putting their health at risk through increasing parity.

## CONCLUSION

Mothers of preterm babies in urban general hospitals are more likely to be older than those in rural areas. Those in rural areas were more likely to lack formal education than those in urban areas.

Rural preterm babies though less likely to be diagnosed with illness than urban preterm neonates experienced higher rates of mortality. Prematurity was the most frequently diagnosed condition in preterm babies.

The need to discourage women from having children at extremes of age to reduce preterm delivery should be considered. Formal education may need improvement among rural women. More research needs to be done on gaps in diagnosis and mortality among preterm babies in urban and rural general hospitals.

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