

Epidemiology of Preterm Delivery in Benin City

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Summary

Ighanesebhor SE, Afadapa MA. Epidemiology of Preterm Delivery in Benin City. *Nigerian Journal of Paediatrics* 1996; 23 : 27. In a retrospective study, the epidemiology of preterm deliveries over a six-year period in Benin City, was assessed. The overall incidence of preterm deliveries was 6.2 percent and this showed an increasing trend over the years. The mean birthweight was 1683gms, mean gestational age 32 weeks and mean maternal age 28 years. A high mortality rate of 34.9 percent was recorded among the preterm deliveries during the neonatal period. Gestational age ≤ 28 weeks and birthweight ≤ 1000 grams were each associated with a mortality rate of over 95 percent. More preterm deliveries took place during the rainy season, a period of higher malaria infection and physical stress. Caesarean section delivery offered no distinct advantage over vaginal delivery for preterm mortality. Primiparity and grandmultiparity were associated with higher mortality rates, whereas maternal age had no effect on preterm mortality rate.

Introduction

PRETERM delivery, defined as gestational age greater than 20 weeks, but less than 37 weeks,¹ continues to be a serious problem in both obstetric and neonatal care, despite several intensive preventive efforts. Prevention of preterm birth is the main theme today in perinatal care, because such a birth is the leading cause of

perinatal mortality.² Risk factors in most preterm deliveries are well known, but these factors remain unknown in some others.^{3,4} In the tropics, notable causes of preterm deliveries include maternal anaemia, malnutrition, haemoglobinopathy, malaria infection and pregnancy-induced hypertension^{5,6} Here in Nigeria, to our knowledge, no comprehensive studies on the various factors, besides the above known ones, that affect preterm deliveries, have been undertaken. For this reason, the present retrospective study was carried out in order to examine the epidemiology of preterm delivery in Benin City, noting in particular, possible aetiologic and associated factors and mortality trends.

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Patients and Methods

Medical records of all preterm live births that were admitted over a period of six years, January 1983 to December 1988, to the neonatal unit, department of paediatrics, University of Benin Teaching Hospital (UBTH), were retrieved. Data extracted from these records included gestational age, sex, birthweight, Apgar scores at one and five minutes, respectively, maternal age and parity and mode of delivery. Also included were outcome of the delivery (alive or dead) and the month and season that the delivery took place. Gestational age was estimated in completed weeks from the first day of the last menstrual period; the age was confirmed by the Dubowitz gestational scoring system which has been found reliable for the assessment of maturity in African babies.⁷ The data were entered on an IBM personal computer, using EXCEL for WINDOWS spreadsheet software. Analysis of the data was undertaken with the statistical package for the social sciences (SPSS/PC+). Simple frequencies and histograms were generated for all variables and means. Cross-tabulation of all variables was then carried out, using the year of birth, outcome of delivery and seasons of birth as dependent variables. Testing of associations in different years was also determined, using the outcome as the controlling variable. Chi square test was used in the statistical analysis.

Results

The number of preterm births was 690 (6.2 percent) out of the 11045 live births admitted in the unit over the six-year period. The sexes were equal, being 345 babies each. The mean of a one-minute Apgar score was 5.66 ± 1.9 , while the mean for the five-minute score was

7.96 ± 2.23 . Of the 690 babies, 422 (61.2 percent) had asphyxia as denoted by a one-minute score of ≤ 6 , while 165 (23.9 percent) had a five-minute score of > 6 . There were 364 (52.8 percent) of the 690 babies who were born during the rainy season (April-September) as compared with 326 (47.2 percent) delivered during the dry season from October to March ($X^2 = 5.24$; $df = 1$; $p < 0.05$).

Total annual births, incidence and mortality among the 690 babies (Table I), showed a gradual decrease in the number of births per year from 2220 in 1983 to 1465 in 1988, while the number of preterm babies, ranging between 99 in 1985 and 139 in 1984, showed only a slight annual increase. The number of deaths per year (range 37-42) and the corresponding mortality rate (range 26.6 - 42.4 percent), showed small yearly increases. The total number of preterm deaths was 241, a preterm mortality of 34.9 percent, while the overall mortality was 241 (2.2 percent) out of the total 11045 babies for the six-year period.

TABLE I

Annual Births, Incidence and Mortality among 690 Preterm Babies

Year	Total No of babies	No of Preterm babies	No of deaths	Percent Mortality
1983	2200	115(5.2)	40	34.8
1984	2275	139(6.1)	37	26.6
1985	2001	99(4.9)	42	42.4
1986	1651	116(7.0)	42	36.2
1987	1453	108(7.4)	38	35.2
1988	1465	113(7.7)	42	37.2
Total	11045	690(6.2)	241	34.9

Figures in parenthesis represent percent of total number of babies

In Table II are shown the gestational ages, number of preterm babies and deaths among the 690 infants. The mean gestational age in the series was 32.8 ± 3.15 weeks (range 22-36 weeks). Babies, aged 28 weeks and under totalled 95 and of these, 88 (92.6 percent) died, compared with a mortality of 19.8 percent among babies, aged between 33 and 35 weeks ($X^2 = 182.6$, $df=4$, $p<0.01$). Mortality was lowest (15.2 percent) among babies, aged between 36 and 37 weeks.

TABLE II

Gestational Ages, Numbers and Mortality among 690 Preterm Babies

Gestational Age (Weeks)	No of babies	No of deaths	Percent mortality
< 26	45(6.5)	44	97.8
26-28	50(7.2)	44	88.0
29-32	166(24.1)	75	45.2
33-35	278(40.3)	55	19.8
36-37	151(21.9)	23	15.2
Total	690(100.0)	241	34.9

Figures in parenthesis represent percent of total preterm babies

The distribution of birthweights (BW), numbers and mortality among the 690 babies are shown in Table III. The mean BW was 1683.4gms (range, 500 - 3400gms). There were 673 (6.1 percent) babies with low birthweight (BW \leq 2500gms) out of the 11045 babies. The largest number of babies weighing between 1501 and 2000gms was 267 (38.7 percent) of the 690 babies. This was followed by 165 (23.9 percent) of those with BW 2001-2500gms. There was an increasing

mortality rate with decreasing BW, such that among babies weighing 1000gms or less, the mortality was 95.7 percent compared with 8.5 percent mortality among those weighing between 2001 and 2500gms ($X^2 = 229.5$, $df = 4$, $P<0.01$)

TABLE III

Distribution of Birthweights, Numbers and Mortality among 690 Preterm Babies

Birthweight (Grams)	No of babies	Total No of deaths	Percent mortality
\leq 1000	94 (13.6)	90	95.7
1001-1500	147(21.3)	77	52.4
1501-2000	267(38.7)	59	22.1
2001-2500	165(23.9)	14	8.5
>2500	17(2.5)	1	5.9
Total	690(100)	241	34.9

Figures in parenthesis represent percent of total number of preterms.

Table IV summarizes the modes of delivery, number and mortality among the 690 preterm babies. The largest number of babies, 398 (57.7 percent) was delivered by the spontaneous vertex approach (SVA). This was followed by 200 (29.0 percent) babies delivered by caesarean section (CS). Vacuum extraction was the least with only three (0.4 percent) of the modes of delivery. Mortality rate of 32.0 percent was the lowest and this was among babies delivered by CS, followed by 33.2 percent among those delivered by the SVA. Between these two mortality rates, there was no statistical difference ($X^2 = 0.1$, $df=1$, $P>0.05$) The highest mortality rate was 54.4 percent

among babies delivered by breech and the difference between this highest and the lowest mortality rates was significant ($X^2 = 11.2$, $df=4$, $P<0.05$).

TABLE IV

Modes of Delivery, Numbers, and Mortality among 690 Preterm Babies

Mode	No of babies	Total No of deaths	Percent mortality
Vertex	398(57.7)	132	33.2
Caesarean	200(29.0)	64	32.0
Breech	57(8.3)	31	54.4
Forceps	32(4.6)	13	40.6
Vacuum extraction	3(0.4)	1	33.3
Total	690(100.0)	241	34.9

Figures in parenthesis represent percent of total number of preterm babies.

Maternal ages, number of babies and deaths are listed in Table V. The highest number, 275 (39.8 percent) of babies, was born by mothers in the age group 26-30 years, while the smallest number of four (0.6 percent) was delivered by those aged above 40 years. The second highest number of babies, 162 (23.5 percent) was delivered by mothers, aged between 21 and 25 years. Mortality of 39.7 percent was the highest among babies of mothers, aged between 31 and 35 years; it was the lowest among babies of mothers above 40 years of age. There was no relationship between the mortality rates and the maternal age groups ($P>0.05$). There were 388 (56.2 percent) babies born to mothers of parity one-to-four (Table VI). Mothers of parity five-to

eight came next, with 197 (28.5 percent) babies. The lowest mortality rate was 29.9 percent among babies delivered by mothers of parity one-to-four. By contrast, primigravidae and mothers with pregnancies of between five and eight, had babies with

Table V

Maternal Ages, Numbers and Mortality among 690 Preterm Babies

Age (Years)	No of babies	Total No of deaths	Percent mortality
≤20	55(8.0)	21	38.2
21-25	162(23.5)	51	31.5
26-30	275(39.8)	95	34.5
31-35	126(18.3)	50	39.7
36-40	68(9.8)	23	33.8
>40	4(0.6)	1	25.0
Total	690(100.0)	241	34.9

Figures in parenthesis represent percent of total number of preterm babies.

Table VI

Parity, Numbers and Mortality among 690 Preterm Babies

Parity	No of babies	Total No of deaths	Percent mortality
0	75(10.9)	31	41.3
1-4	388(56.2)	116	29.9
5-8	197(28.5)	82	41.6
9-12	26(3.8)	10	38.5
>12	4(0.6)	2	50.0
Total	690(100.0)	241	34.9

Figures in parenthesis represent percent of total number of preterm babies.

mortality rates of 41.3 and 41.6 percent, respectively.

Discussion

The 6.2 percent incidence of preterm babies in the present study was slightly higher than the 5.1 percent reported from the same department about 12 years ago.³ It is also noteworthy that our present findings of 6.1 percent incidence of LBW was similar to the 6.2 percent that Omene *et al*³ reported earlier. The incidence of LBW elsewhere in the country has been reported to be 13, 8.8 and 25.7 percent respectively.⁸⁻¹⁰ As shown above, 61.2 percent of babies were asphyxiated at birth and this rate of asphyxia is to be expected among the babies in the present series with a mean birthweight of 1683gm and mean gestational age of 32 weeks. The present finding of a significantly higher number of babies delivered during the rainy than the dry season was of great interest and may be explained on the basis of physical stress,¹¹ such as is involved in farming during the rainy season and high malaria infection during this period.¹² In the present study, while there was a gradual decrease in the total number of births, the incidence of preterm deliveries increased only slightly, from 5.2 percent in 1983 to 7.7 percent in 1988. Over the same period, mortality rate increased to a maximum of 42.4 percent in 1985 and thereafter, it dropped to a minimum of 35.2 percent in 1987.

Although the incidence of preterm babies with gestational age 28 weeks and under, was 13.8 percent, a mortality of 92.6 percent amongst this group of babies was the highest in the series. This mortality rate was significantly higher ($P < 0.01$) that the 19.8 percent re-

corded for babies, aged between 33 and 35 weeks of gestation. Furthermore, this mortality rate was much higher than the combined 61 percent mortality for under 26 weeks gestation and seven percent mortality for 27-29 weeks gestation reported from the USA.¹³ From our present findings and those from the USA, the chances of survival by these preterm babies improved with increasing gestational age. With regard to BW, there was an increasing mortality rate with decreasing BW, such that among babies weighing 1000gms or less, the mortality rate was 95.7 percent compared with 8.5 percent mortality recorded for babies weighing between 2001 and 2500gms. These high mortality rates among babies of low gestational age and BW appear to be due to several factors including immaturity of vital body organs, but in our peculiar low socioeconomic circumstances, it was most probably, also due to lack of modern facilities for intensive neonatal care.

It is pertinent to note that although the number of babies delivered by SVA was almost double that of babies delivered by CS, the difference in the mortality rates between these modes of delivery, was not significant. Mortality rates for these two modes of delivery were lower than that of breech and forceps deliveries. This finding has shown that there is no distinct advantage in delivering these babies by CS over delivery by spontaneous vertex approach, thus supporting the views expressed by other workers.¹⁴⁻¹⁷ With a rate of 39.7 percent, mortality was highest among those born by mothers, aged between 31 and 35 years and least among those born by mothers in the age group 21-25 years. However, there was no difference in the mortality rates between the different age groups. These find-

ings are in agreement with the suggestion that has been made that maternal age may not be a significant contributor to preterm mortality compared with such factors as prematurity and its complications. In the present study, mortality rates among babies of primigravidae and grandmultiparae were the highest being 41.3 percent and 38 percent, respectively; these findings are similar to those reported by others.¹

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