

# INFANT MORTALITY RATE WITH BIRTH WEIGHT LESS THAN OR EQUAL TO 1,500 GRAM IN NIGERIA

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## **Abstract**

*This study examined critically infant mortality in Nigeria using the survey data and information from an active search of the medical records of Federal Ministry of Health. The paper compile information on the hospital mortality of infants born in Nigeria with birth weights less than or equal to 1,500g and compare it with data from the VON. Our analysis and findings is in line with basic demographic. We found high rate of mortality among very low birth weight infants, with a greater concentration during the first week of life. Our finding also reveal infant mortality rate in Nigeria as 96/1000.*

**Keywords:** Mortality, Neonatal, Very low birth weight infants

Over the last 10 years, neonatal mortality has come to account for a significance fraction of the mortality rate. This fraction has increase in proportion with a reduction in the post-neonatal component. In the more developed regions of Nigeria, the decline in neonatal mortality has taken place slowly, tending towards stability, although levels remain elevated. In the northwest, this decline has proceeded more slowly, comparatively. It is important to emphasize that mortality rates are related to the three

sets of factors: the biological characters of the mother, the socio-economic conditions of the family, and the availability and quality of prenatal medical care.

Mortality rates among children aged less than five years in developing countries have declined over the past years consequent to improved socio-economic conditions and child –survival programme (Brenner *et al.*, 1999). Infant mortality has also declined in most settings; the challenge is now how to reduce the current rates further. One of the ways could be to obtain greater insights into the process underlying infant death, beginning from recognition of illness and its severity by the family, care-seeking practices, and the quality of care received when it is sought. This knowledge will help improve the impact of current programme.

Mortality is one of the components of population changes. It is completely out of human control and affects every segments of a population. Thus, one of the best indicators of social economic and environment condition of a population is its infant mortality rate (Victoria, Barros (2001).

Infant mortality remains disturbing high in developing countries despite the significant decline in most part of the developed world. The state of world children indicated that about 12.9 million children die every year in developing world (UNICEF) 1982.

Furthermore, the Nigeria demographic and health survey (NDHS), 1990 reported that 87 of 1000 infant born in Nigeria die before their birth day. The 1999 (NDHS) reported an infant mortality rate of 5 death per 1000 live birth. A federal offices of statistics survey reported the infant mortality rate to be 105 death per 1000 live birth from census conducted in 1999 for five years immediately preceding the 1999 -2003 survey, the infant mortality was 100 death/1000 live birth.

Over the last 10 years, neonatal mortality has come to account for a significant fraction of the infant mortality rate this fraction has increased in proportion with a reduction in the post neonatal component (Megama, 1980). In the more developed region, the decline in neonatal mortality has taken place slowly, ending towards stability, although level remain elevated in the northeast, this decline has proceeded more slowly comparatively.

Despite the reduction of VLBWI (1.5-2%) within the population of live births, they approximately 1/3 of the total infant mortality. Reducing mortality rate within this subset of newborn is major challenges and would, in turn have a major impact on reducing infant mortality.

Investigation have revealed thus the vast number who fall victim are those children from poor family that often could not afford the hospital bill or high cost of drugs required for the survival of their children, and lack of adequate health facilities to take care of the children as a result of which many infant are dying of sickness like malaria, polio, measles, whooping cough, neonatal tetanus and diarrhea.

The objective of this research work is to compile information on the hospital mortality of infants born in Nigeria with birth weights less than or equal to 1,500g, and to compare it with data from the VON, considered a reference standard for neonatal care.

### **Background characteristics of surveyed women**

The characteristics examine age, region of residence, level of education. The characteristics are the ones for which data is available and are suspected to be associated with infant mortality in Nigeria.

The distribution of respondents according to these characteristics are shown in the Table A below.

**Table A: Respondent Background Characteristics**

<b>Age</b>	<b>Weighted %</b>
15 – 19	19.4
20 – 24	18.4
25 – 29	18.9
30 – 34	13.9
35 – 39	11.7
40 – 44	9.1
45 – 49	8.6
Education level	
No. education	35.8
Primary	19.7
Second higher	44.6
Residence	
Urban	35.7
Rural	64.3

The Nigeria demographic health survey (NDHS) 2010.

### **Current age**

Age is very important in demographic variable. The women in age 15 – 49 years is an important segment of the population age distribution. The age of women was recorder in completed years. Table A shows that the most of the women respondents were under 20 years. Which accounted for about 19.4% and about 51.2% of women were enumerated in the age bracket of 20 – 34.

### **Level of education**

This distribution of the survey by their highest level of education shows that most of them about 35.80% had no education and about 44.6% had secondary or higher education. The level of education of the survey population appear to be low when compared with that of VON.

### **Region of residence**

In this distribution of the respondent were more in rural – 64.3% and 35.7% in the urban area. Therefore, it shows that there is high infant mortality in rural area because they have low maternal education.

### **The trend of infant mortality**

Mortality level refers to the impact on the population. Any of the indices already discussed IMR can be used among the level of mortality in Nigeria.

The essence of estimating the level and trend of infant mortality in Nigeria is for planning, policy formulation, implementation and monitoring.

**Table B: Infant Mortality in Nigeria**

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2001	73.4
2002	72.20
2003	71.35
2004	98.80
2005	98.80
2006	97.14
2007	95.52
2008	95.74
2009	94.35
2010	93.10

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Source: NBS

From the trend it is considered that there is slight decline from 2001 to 2003 then increases from 2003 to 2007, thereafter declines slightly.

### **Methodology**

A prospect cohort was studied, made up of all infants born alive with birth weight less than or equal to 1500g between February 1, 2001 to November 20, 2010 at hospitals and maternity services with neonatal intensive care unit (NICU) in Nigeria. The very low birth weight infants (VLBWI) category definition had not included infant with birth weights of 1500g. However for this study they were included in order to allow comparison with Vermont Oxford Network (VON). Infants were enrolled at birth, with data collected in the delivery room and from an active search of medical records Federal Ministry of Health. In order to analyze intra hospital mortality, VLBWI weight less than 1500gram were broken down into 100g categories, because these divisions are associated with significant changes in mortality, and they are also classified into 250g weight ranges (501 – 750, 751 – 1000g, 1001 – 1250g, 1251 – 1500g) since these are the divisions adopted by the VON, thus making comparisons feasible. The current study adopted the data base standards defined by the VON to define and collect variable and to calculate the principal outcome indicators.

Excess in Nigeria was calculated by direct standardization, defining the standard population as the sum of two population (VON and Nigeria). Excess risk of death in Nigeria was calculated by applying the mortality rate obtained by the VON in 2002 for each weight category to the children born in Nigeria. Death that occurred in hospital mortality of infant  $\leq 1500\text{g}$ .

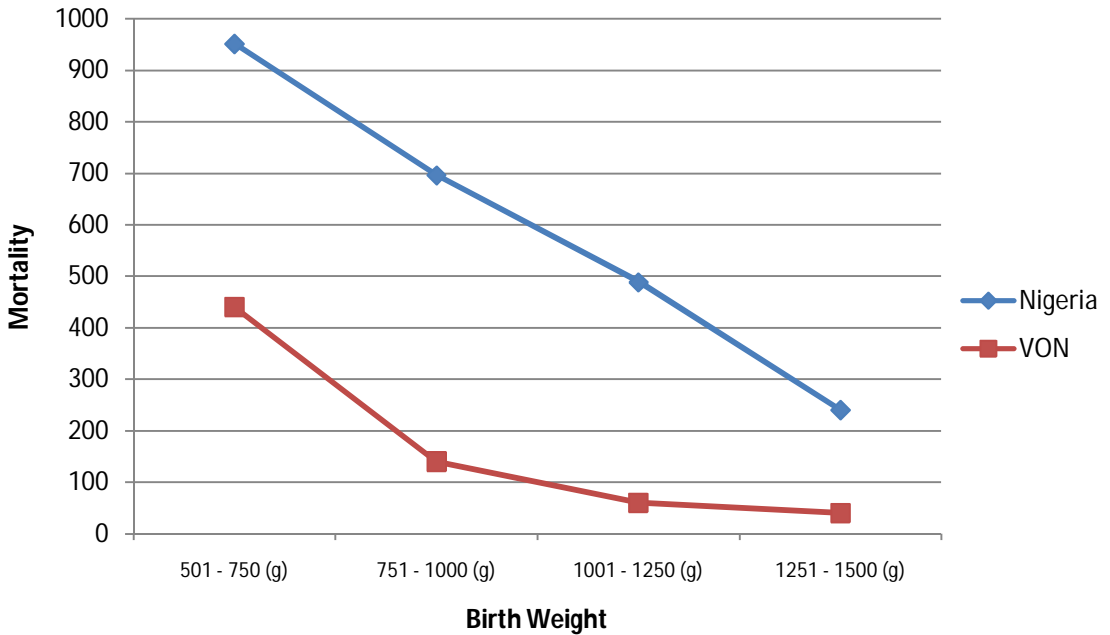
Survival was analyzed according to birth weight, hospital death, live birth, early neonatal death and late neonatal death are recommended by WHO.

The variable death in hospital was analyzed as follows:

- ❖ Death on days 0- 6 early neonatal
- ❖ Death on days 7 – 27 neonatal hospital mortality
- ❖ Death on days 0 – 27 neonatal hospital
- ❖ Death after 27 days post neonatal mortality

Simple descriptive statistics such as percentage and tabulation were used to discuss the background characteristics of the surveyed women.

The characteristics for which data were tabulated include current age, residence, region and education. The importance of this lies on the fact that it may help to provide information that may be used to interpret results. Table B was used to analyze the trend of infant mortality in Nigeria.



**Table C: Excess risk of death in Nigeria, when compared with Vermont Oxford**

**Fig 1: Comparative analysis the data from Nigeria and Vermont Oxford Network.**

**Network.**

Birth weight(s)	Nigerian		VON			
	(n)	(n)	(n)	(v)	(v)	(v)
	Live weight	Death	Mortality	Live birth	Death	Mortality
501 – 750	102	97	951	6519	2868	440
751- 1000	168	117	696	7712	1080	140
1001 – 1250	246	246	488	8273	496	60
1251 – 1500	258	258	240	9835	393	40
Total	774	774	512	32339	4837	150

**Results**

The distribution of the VLBWI by birth weight category, hospital mortality coefficient and the days before is shown in table 1. The global hospital mortality coefficient for all newborn infants during the study period was 512/1000 live birth. Survival of infant born weighing less than 1000g was just 20.7% .approximately 50% of

newborn infant with birth weight of 10001 – 1250s survived. The highest probability of death observed for infants with birth weight of 1251 –1500g (24%). Two thirds of all death among these infants occurred within 6 days of birth. The greatest concentrations of deaths was found on the first day of life with 92 occurrence (23.3% of all deaths). There were 110 deaths (27.8% of all deaths) during the late neonatal period. Few newborn infant 27>68% overall died during the post neonatal period.

The neonatal mortality rate was 477/1000 live-births and post-neonatal hospital mortality was 35/1000, taking total hospital mortality to 512/1000. The coefficient of early neonatal was 142/1000. Observe that early neonatal mortality is 24 times that of late neonatal mortality (Table 2).

The three demonstrates that the excess risk of death in Nigeria when compared with that of VON, is approximately 3.41. Greatest risk was observed in the 1001 – 1250g weight band. Deaths that occurred in Nigeria were considered avoidable infact, they would not have occurred if the mortality rate from each birth weight division had been achieved.

Fig. 1 is an analysis of hospital mortality by 100g birth weight subsets, since those divisions are associated with significant changes in mortality and make comparative analysis with the data from Nigeria and VON possible. When mortality figures from VON are compared with the greatest differences is also found in the same weight range, being seven to eight.

**Table 1: Distribution of death infant with birth weight less than or equal to 1500g, according to the day on which death occurred and birth weight ranges.**

	Hospital mortality coefficient	Early neonatal death		Late neona tal death	Post- neo nat al death
		1 <sup>st</sup> day	2 – 6 days	7 – 27 days	< 27 days
Birth weight (g)	N(%)	N(%)	N(%)*	N(%)*	N(%)*
501 – 750(LB =102)	97(951)	37(363)	46(451)	11(108)	3(29)
751 – 1000 (LB = 246)	117 (698)	23(137)	53(315)	35(208)	6(36)
1001- 1250 (LB = 246)	720 (488)	19(77)	56(228)	34(138)	11(45)
1251 – 1500 (LB = 258)	62 (240)	13(50)	12(47)	30(116)	7(27)
Total (n = 774)	396 (512)	92(119)	167(216)	110(142)	27(35)

**Discussion**

This Study Analyzed Approximately 95% of the VLBWI born alive in Nigeria. Data from Ministry Of Health Nigeria that the coefficient of infant mortality was

26/1000 live birth. Death of VLBWI account for approximately 42 of overall infant mortality. An important point to underscore is that this subjects of infant makes this contribution to the infant mortality rate despite its low incidence within overall live birth (2%). In 1999, the infant mortality coefficient overall live birth (2%). The lower of the overall infant mortality, the greater the relative contribution of this subset of newborn infants to the coefficients will be In contrast, the VON allows comparison to be made with result from developed countries considered the best references standard for VLBMI care.

In this study, specific mortality for VLBMI was 512/1000 live birth (396 new born infants). The coefficient can be considered elevated if compares with the result from VON.

**Table 2: Distribution of death infants with birth weight less than or equal to 1500g, according to the day on which death occurred and birth weight ranges**

Birth weight	Neonatal			Neonatal mortality				Hospital mortality					
	LB	N	%	0 – 6 day rate*		7 – 27 day rate		0 – 27 day rate*		>2dayrate*		Rate*	
				N	%	N	%	N	%	N	%	N	%
501 – 600	39	39	1000	-	-	39	1000	-	-	39	1000		
601 – 700	44	34	713	6	136	40	909	2	45	42	955		
701 – 800	57	35	614	11	193	46	807	1	18	47	925		
501 – 900	52	25	481	15	288	40	750	2	38	42	808		
901 – 1000	78	26	333	14	179	40	513	4	51	44	564		
1001 – 1100	88	33	375	15	170	48	545	4	45	52	591		
1101 – 1200	104	25	240	15	744	40	385	7	67	47	452		
1201 – 1300	97	26	268	15	144	39	402	1	10	40	412		
1301- 1400	101	8	79	13	129	21	208	3	30	24	238		
1401 – 1500	114	8	70	5	70	16	146	3	26	19	167		
Total	774	259	335	110	142	369	477	27	35	396	512		

Nigeria has higher mortality coefficient than the VON does in all other weight ranges.

In comparison with VON, mortality was elevated in all weight ranges, emphasizing the extremely limited survival (approximately 21%) of the under 100g of subset for the VON. It is 72% nevertheless, the difference in mortality becomes significantly more accentuated in the weight range from 1000 – 1300g. This fact of great importance, since this weight range exhibit better mortality reductions in response to the introduction of preventative and therapeutic resources that are available in Nigeria



hospitals, such as the use of surfactant and the administration of antenatal corticoid to mothers.

Rosello, Benard, Oslow(2007) assessed the impact of the use of surfactant on neonatal mortality in Nigeria concluding that it's use had reduce the just week mortality by around 50% after this period it still achieved a significant reduction of 18% in global hospital mortality up to discharge.

In the same study, the subset of infant smaller than 1000g exhibited a significant increase in complications such as bronchopulmonary dysplasia, intraventricular hemorrhage in contrasts with developed countries. This fact is probably the result of increased survival among this subset of infant who, tend to use surfactant, had the opportunity to develop later complications and even make possible the displacement of their death to later phase.

What may be happening in Nigeria is the same phenomenon that was studied 10 years ago by Rosello *et al.*, displacement of the point of death was observed in our study in a higher weight range than in that study at 1300g – 1500g (table 2), with a reduction in early neonatal mortality and a concurrent increase in the late neonatal mortality, suggesting a deficiency in the ability of Ministry of Health to provide effective care to these new born infants.

Analysis of the mortality fig for VLBWI in Nigeria makes it possible to draw out certain relevant features, which are described below. Early neonatal mortality coefficient are elevated in all weight ranges only 67 of every 100 VLWI who are born survive their 1<sup>st</sup> week. This mortality rate suggests care deficiencies at the hospitals and also unsatisfactory care conditions during the antenatal period or at the point of birth.

In this study, we have examined critically infant mortality in Nigeria using the survey data of 2001 to 2010. The primary emphasis of our study is infant mortality with birth weight less or equal to 1,500g. Our analysis and finding is in line with basic demographic principles.

## **Findings**

The paper examine the effects of a child's place of birth, mother education region of residence on infant mortality in Nigeria between 2001 and 2010. From infant trend decline slightly 2001 to 2003. Children born in modern health facilities irrespective of their mother's place of residence experienced significantly lower rates of infant mortality than those born on areas with little or no good health facilities.

As a 2008, infant mortality rate in Nigeria 96/1000 live birth. The research of this study has shown a considerable variation among infant mortality between socio-economic group. In the main percentage analysis, the research reveal that children to mother with higher education experience lower mortality.

The analysis show the continued relative importance of maternal education as a factor in determine the survival of children. This shows clearly that maternal education has a major influence on infant mortality.

A total of 774 newborn infant were analyzed. The neonatal mortality was 477‰ and the post neonatal mortality coefficient was 35‰. Coefficient of late neonatal mortality was 142‰. Mortality coefficients were high in Nigeria for all weight ranges than on the VON. The result demonstrate high in rate of mortality among very low birth weight infant, with a greater concentration dying the 1<sup>st</sup> week of life suggesting that not only the care provided at the neonatal intensive care unit (ICU) is deficient, but also that prenatal and delivery room care is inadequate.

### **Recommendations**

These marked contrast in the survival chances of infant, suggest that there should be a balancing in federal allocation in health sector between the rural and urban settlements. This simply means that as far as infant mortality is concerned, Nigeria is still far from the millennium development goal. However, the country can be moved close to the goal if these points are considered. Since there is a significant relationship between education and infant mortality, effort should be made to improve women education, and at the same time infrastructural and health facilities in rural areas should be improved. The immunization programme should be extended to remote parts of the country. Enlightenment programme on health issues relating to infant should be embarked upon both in the rural and urban areas.

Evidence from the current study shows that women from low socio-economic status stand higher chance of losing their children. Efforts should be made to implement changes to hospital practices that will bring better result with involvement of the professional working on the neonatal.

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