

Research paper

**PATTERN OF NEONATAL MORTALITY IN A TERTIARY HEALTH FACILITY
IN UMUAHIA, SOUTH EAST, NIGERIA**

Abstract

Background:-

Neonatal mortality is increasingly important because the proportion of under - five deaths that occur during the neonatal period is increasing as under five mortality declines.

Systematic action is required by Governments and partners including national paediatric associations.

Methods:

A review of the admissions and mortality register including folder of the babies admitted into the newborn special care unit of the Federal Medical Centre, Umuahia between December 1st, 2000 and November 30th, 2010 was undertaken. Data extracted from the records included: socio-demographic variables, birth weight, diagnosis/cause of death, duration of hospitalization, place of delivery (inborn/out-born), and source of referral.

Results:

2,756 neonatal admissions were recorded during the period under review, out of which 440 died, giving an overall mortality rate of 16.0%.

Majority of the deaths (56.8%) were in out-born patients compared to 40.2% in-born.

Forty two percent (185/400) of the deaths occurred within 24 hours of hospitalization while 25.9% (114/400) took place after 72 hours of admission.

Majority of the deaths (52.8%) occurred among low birth weight babies while the five leading causes of mortality were birth asphyxia (32.0%), prematurity (30.2%), neonatal sepsis (13.2%), severe neonatal Jaundice (9.3%), and neonatal tetanus (3.2%).

Conclusion:

The neonatal mortality rate as observed in the current study is quiet high with most of them resulting mainly from preventable causes. High cost effective maternal and newborn

28 interventions could be applied even at community levels where most of the deliveries occur
29 to save lives of the newborns.

30 **KEY WORDS:** Outcome; pattern; neonate; mortality Rate,

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53 INTRODUCTION

54 Neonatal deaths are deaths occurring during the neonatal period, commencing at birth and
55 ending 28 completed days after birth.¹

56 Neonatal mortality rate is the number of neonatal deaths in a given year per 1000 live births
57 in that year.¹

58 Neonatal mortality is increasingly important because the proportion of under - five deaths
59 that occur during the neonatal period is increasing as under five mortality declines.²

60 Nearly 4.7 million mothers, newborns and children die each year in Sub-Saharan Africa,² and
61 about 1.2million babies die before they reach one month of age.³ In addition an estimated
62 880,000 babies are still born in Sub-Saharan Africa and remain invisible on the policy
63 agenda. Every minute seven newborn babies die worldwide (415 newborn babies every hour).

64 The vast majority of neonatal deaths occur in South Asia and Sub-Saharan Africa.^{5,6} Half of
65 the 3.3million neonatal deaths in year 2009 were in five countries: India, Nigeria, Pakistan,
66 China and Democratic Republic of Congo. Neonatal mortality constitutes 40% of under-5
67 mortality and approximately 57 percent of infant mortality globally.⁵The neonatal mortality
68 rate in Nigeria is 40 per 1000 live births. This is largely higher than the 33 per 1000 live
69 births overall in Africa.⁷ Various rates have been reported by different researchers in Nigeria
70 ranging from 19.4 percent⁸ to 37.6 percent⁹ among hospitalized newborns and in a rural
71 community respectively. The three main causes accounting for 88% of newborn deaths in the
72 region include: infections (including sepsis/pneumonia, tetanus and diarrhoea); intra-partum
73 related conditions (birth asphyxia); and preterm births.⁵ Up to 90% of newborns who die are
74 low birth weights (less than 2500grams) including preterm babies who have the greatest risk
75 of deaths.

76 It is amazing that most of these deaths are preventable with such simple actions/care like
77 warmth, feeding, hygiene and early treatment of infections.¹⁰ Worldwide, birth asphyxia,
78 birth trauma, infections, prematurity, and malformations, are the major causes of early
79 neonatal deaths worldwide while sepsis, pneumonia, meningitis, diarrhoeal disease and
80 tetanus account for most of the mortality during the rest of the neonatal period.⁶

81 High neonatal mortality rate remains a problem in developing countries including Nigeria
82 where the economic situation and poor planning of health services have led to little
83 appreciable advancement in neonatal care.¹¹ Neonatal mortality is therefore a reflection of the
84 effectiveness of obstetric and neonatal services in any particular community.¹²

85 However, interventions to reduce neonatal deaths should include improvements in obstetric
86 care and immediate care of the newborn afterbirth. It has been reported that basic emergency
87 obstetric care (providing antibiotics, oxytocics, anticonvulsants, removal of placenta and
88 retained products, assisted vaginal delivery and newborn care in healthcare centres) and
89 comprehensive emergency obstetric care (blood transfusion caesarean sections, care to sick
90 and low birth weight newborns in district hospitals) and skilled birth care can reduce intra-
91 partum deaths by 25 – 85%.¹³

92 Adequate training with provision of equipment required for neonatal resuscitation of
93 newborns with intra-partum asphyxia must be accompanied by plans to replace such
94 equipment or parts of equipment that are found not to be in working condition.¹⁴

95 The fourth millennium development goal (MDG 4) aims to reduce mortality rate in children
96 under the age of 5years (U5MR) by two thirds between 1990 and 2015. Infants less than 1
97 month old account for about 40% of deaths of children under the age of 5years globally.¹⁵
98 Achieving MDG4 will therefore need to include reducing deaths during the neonatal period.¹⁴

99 With less than 2 years left to achieve the United Nations Millennium Development Goals
100 (MDGs) for maternal and child health, most African countries are currently unlikely to meet
101 their MDG targets.

102 It is pertinent therefore that periodic audit of neonatal admissions and deaths be carried out to
103 determine the impact of current preventive measures and newer challenges to neonatal
104 survival, so that effective preventive measures could be applied. The aim of the current study
105 was to audit the neonatal deaths at the newborn special care unit, of Federal Medical Centre,
106 Umuahia over a ten year period, so that priority areas requiring improved planning of
107 neonatal services could be identified.

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112 MATERIALS AND METHODS

113 This study was undertaken in the newborn special care unit (NBSCU) of Federal Medical
114 Centre (FMC) , Umuahia, Abia State, South-East, Nigeria.

115 The Centre serves not only as a referral centre for patients from within Abia State but also the
116 adjoining states. The newborn babies were basically referred in house from the labour ward
117 and obstetric theatre of the Department of Obstetrics and Gynecology of FMC, Umuahia and
118 out-born (those babies born before arrival to the hospital) from maternity homes, primary or
119 secondary health facilities in our service areas. . The NBSCU has three sections: for inborn
120 (delivered in FMC, Umuahia), out-born (referrals) and an isolation section for very ill-
121 newborns all geared towards reduction of cross infection within the nursery.

122 Data on newborns that died during the period under review (from 1st January, 2001 to 31st
123 December, 2010) were extracted from the admissions/mortality register as well as the patient
124 folders.

125 Data retrieved included: age on admission, gender, place of delivery (inborn/out-born),
126 diagnosis(es) at presentation, cause of death, duration of hospitalization and age at death.

127 The data retrieval were documented in a structured study proforma, computer entered and
128 analyzed using Statistical Package for Social Sciences (SPSS) Version 18 software.

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RESULTS

Total number of neonatal admissions over the period was 2,756. Figure 1 shows the average monthly admissions over the 10 year period between December 1st, 2000 and November 30th, 2010.

The number of deaths was 440, comprising 235 (53.4%) males and 205 (46.6%) females (Figure 2). The neonatal mortality rate during the period of review was 16.0%.

Mean age at death was 4.7 ±6.0 days. One hundred and seventy seven (40.2%) were inborn while 263 (59.8%) were out born patients (see Figure 3)

One hundred and fifty one (57.4%) of the out born patients were delivered in secondary health facilities including private hospitals, 74 (28.1%) were born in primary health centres and maternity homes, 36 (13.7%) were delivered at home while 2 (0.8%) were delivered in prayer houses.

More than half of the babies (294) were delivered through spontaneous vertex delivery, 97 by emergency caesarean section, while 26 had no records of method of delivery (Table I)

Out of the 440 neonates that died, 400 had their birth weight recorded of which 52.8% (211) were low birth weight.

The leading causes of neonatal deaths were birth asphyxia 141(32.0%), prematurity 133(30.2%), neonatal sepsis 58 (13.2%), severe neonatal jaundice 41 (9.3%), and neonatal tetanus 14 (3.2%). This is as shown in Table II.

Forty two percent (185) of the deaths occurred within the first 24 hours of hospitalization and 25.9% (114) after 72 hours of admission (see Table III).

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173 DISCUSSION

174 The overall neonatal mortality rate of 16.0% observed in the current study is quite high. It is
175 however, higher than the, 13.0%¹⁶ reported in Ilesha, South-West Nigeria but lower than
176 19.4%⁸ in a similar study in Nnewi, South-East Nigeria. All three studies were hospital based
177 and may not represent the actual magnitude of the problem in the general population.
178 However, the emphasis of the current study is to highlight the pattern of neonatal mortality in
179 our locale from a tertiary hospital point of view and sensitize the authorities to review the
180 existing facilities and programmes linked with newborn services for optimal service to save
181 newborn lives.

182 Majority of the cases were males, in conformity to other similar reports.^{8, 17, 18, 19.}

183 It is likely that the higher risk of mortality in male neonates may be due to large proportions
184 of neonatal deaths occurring in the first week of life, which is the time when gender
185 differences in neonatal mortality are more pronounced.²⁰ The biological factors that have
186 been implicated with this increased risk of neonatal deaths in male infants include
187 immunodeficiency,¹⁹ increasing the risks of infectious diseases in males, late maturity²¹
188 resulting in a high prevalence of respiratory diseases in males, and congenital malformations
189 of the urogenital system.¹⁷

190 Neonatal mortality rate was lower among babies delivered in the hospital (inborn) compared
191 to the out-born (born before arrival, or referred babies) confirming previous reports by other
192 workers.^{8,22.}

193 Some of the babies could have been transported from rural areas with challenges of
194 hypothermia and contamination before getting to the Facility and hence increasing mortality
195 in them.

196 In the current study it was observed that some of the mothers had the deliveries of their
197 babies conducted either at homes or prayer houses by traditional birth attendants and in some
198 cases by auxiliary nurses/midwives. This practice has been associated with increased
199 morbidity and mortality in the newborns.²³ The practice could either be due to poverty or
200 failure of the health system.

201 Birth weight has been shown to be a strong predictor of newborn survival/outcome. In the
202 current study low birth weight was associated with higher mortality as in other similar
203 studies.^{8, 9, 22.}

204 The leading causes of neonatal deaths in our series included birth asphyxia, prematurity,
205 sepsis, severe jaundice and tetanus and this mirrors other reported pattern of neonatal
206 mortality elsewhere in Nigeria^{8, 16, 23, 24} and indeed sub - saharan Africa.²⁵

207 Most of these causes are largely preventable with simple actions/care. It was observed that
208 most of the mortality occurred within 24hours of hospitalization, majority of which were due
209 to perinatal asphyxia. It has been shown that basic training on newborn resuscitation skills
210 and proper newborn resuscitation immediately after birth has proved to reduce mortality
211 among babies born with asphyxia by up to 40%.²⁶

212 Prematurity was found to be the second most important cause of death in the current study.
213 Management of premature babies requires highly specialized equipment, highly trained
214 personnel and financial support.^{27, 28} Despite the challenges of meeting these in our
215 environment, some specific and simple measures have been identified which could be
216 implemented to reduce deaths related to low birth weight and prematurity in low income
217 countries.^{29,30,31} among others. These include prophylactic use of steroids during premature
218 labour, antibiotics for premature rupture of membranes, early breastfeeding, treatment of
219 infectious, Kangaroo mother care, prevention of hypothermia. All these if effectively
220 implemented and sustained will help in reducing the neonatal mortality rate in our setting.

221 Globally, neonatal tetanus accounts for 7% of neonatal deaths but accounts for up to 20% in
222 Nigeria, one of the 27 countries that account for 90% of the global burden of the disease.
223^{15,32,33} It is not surprising therefore that some babies (3.2%) in this setting passed on as a
224 result of neonatal tetanus.

225 Neonatal tetanus has been identified as a disease of poverty, the uneducated and adverse
226 social and environmental circumstances.³⁴ All these variables for propagation of tetanus
227 infection are in operation in our locale, and hence the need to highlight it and ensure that
228 effective tetanus vaccination and early and appropriate prophylaxis of at risk neonates is the
229 rule.

230 Neonatal deaths resulting mainly from preventable causes namely birth asphyxia, neonatal
231 infectious including tetanus, prematurity/low birth weight among others are still the leading

232 causes of neonatal mortality in our setting. Neonatal mortality rate is a critical index of under
233 - 5 mortality.⁵ And significant reduction in neonatal mortality will go a long way in ensuring
234 that Nigeria meets the MDG 4 for child health. Knowledge of the existing pattern of neonatal
235 mortality is the key to determining which measures to be applied to reverse the unacceptable
236 trend of newborn deaths in our setting.

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Fig. 1: Average Monthly Admissions.

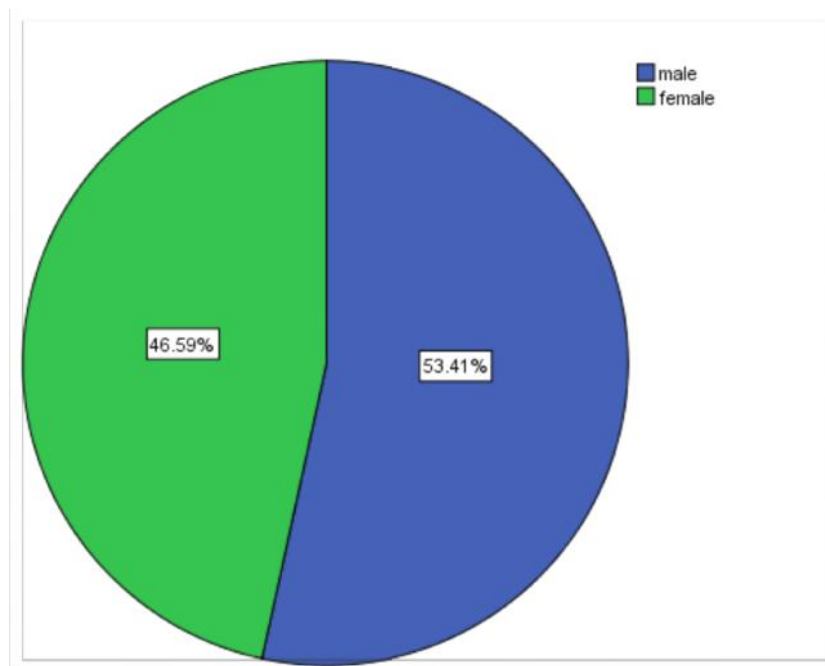
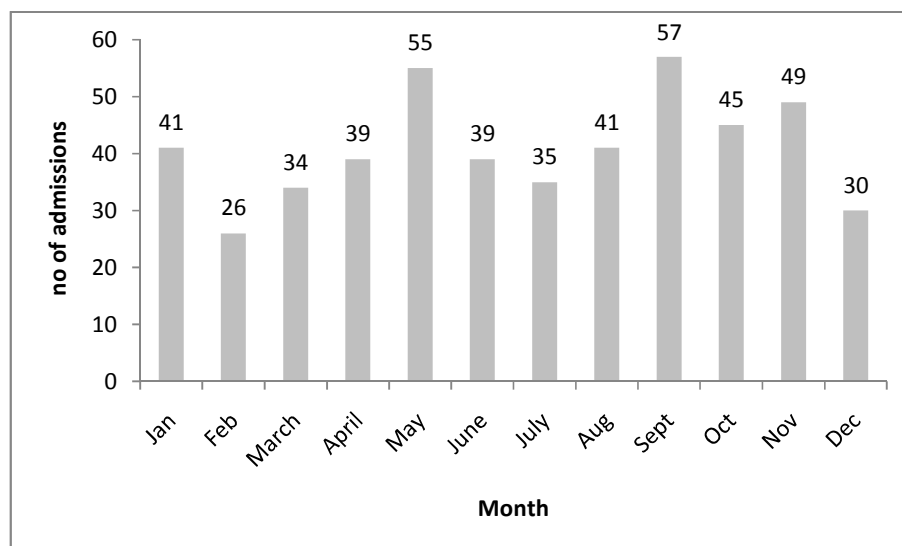


Fig. 2: Gender Distribution of Mortalities

Key: Males (blue) and females (green).

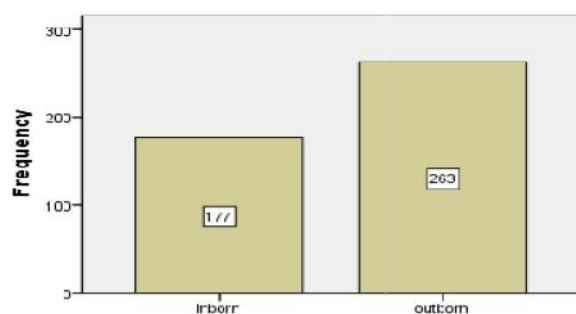


Fig. 3: Place of Delivery of Babies (Mortalities Only)

Table I: Method of Delivery

Method	(N)	%
Spontaneous vertex	294	66.8
Emergency C/S	97	22.1
Elective C/S	15	3.4
Instrumental delivery	5	1.1
Breech extraction	3	0.7
? method	26	5.9
Total	440	100.0

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415 Table II: Causes of Neonatal Mortality.

Disease	(N)	%
Asphyxia	141	32.0
Prematurity	133	30.2
Neonatal sepsis	58	13.2
Severe neonatal jaundice	41	9.3
Neonatal tetanus	14	3.2
Neonatal meningitis	12	2.7
Meconium aspiration syndrome	8	1.8
Surgical conditions	8	1.8
Multiple congenital anomalies	7	1.6
Pneumonia	5	1.1
Severe anaemia	3	0.7
*Miscellaneous	10	2.3
Total	440	100.0

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417 *Haemorrhagic disease of newborn, cyanotic congenital heart disease, HIV related, Birth
418 trauma

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423 Table III: Duration of Hospitalization

Duration (hours)	(N)	%
<24	185	42.0
24-48	90	20.5
48-72	51	11.6
>72	114	25.9
Total	440	100.0

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