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Full Length Research Paper

Pattern of morbidity and mortality in the newborn special care unit in a tertiary institution in the Niger Delta region of Nigeria: A two year prospective study

G I McGill Ugwu

Department of paediatrics Delta State University Oghara Delta State Nigeria
E-mail: gnclinic@yahoo.com; Phone: +2348026239010

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To determine the pattern of morbidity and mortality of admitted newborns in the Neonatal Intensive Care Unit of Delta State University Teaching Hospital Oghara. Newborn morbidity and mortality are still very high in developing countries despite significant decline in developed countries. The quality of newborn care depends among other things, the establishment of the special care baby unit, regular audit and evaluation of services rendered. All neonates admitted into the Newborn Intensive Care Unit (NICU) of Delta State University Teaching Hospital Oghara in Niger Delta of Nigeria over a two year period between January 2010 and December 2011, were prospectively studied. Information documented include the biodata of each child, the diagnosis, services rendered and outcome. A total of 646 neonates were admitted during the period of review. The male: female ratio was 1.2:1 in favour of the males.(350:296). Of these, 108 were due to prematurity (16.4%), 24(3.9%) due to intrauterine growth restriction,116 (18.3%) with birth asphyxia. 228 (35.5%) were due to neonatal sepsis, 8(1.5%) neonatal tetanus. 60 (9.5%) had neonatal jaundice while 102 or(14.9 %) were due to other diseases. Of the 228 with neonatal sepsis, only in 80 (35.1%) was the sepsis culture proven, with 47.4% as presumed sepsis and 17.5% of cases, the neonates had other comorbid states. The overall mortality rate was 20.3%. The ratio of male to female deaths was 2.31 with the case fatality rate also higher in males than females at 26.3% and 14.1% respectively. Sepsis accounted for 25.7% of the deaths, birth asphyxia 24.1%, prematurity 22.6%. However the case fatality rate showed neonatal tetanus to be highest at 50%, Prematurity 27.8%, birth asphyxia 27.6% and neonatal sepsis 14.9%. Though more patients seen and died had neonatal sepsis, the case fatality rate showed neonatal sepsis to be just slightly above half of that for prematurity and birth asphyxia which are almost at par. Case fatality for tetanus remains very high. Regular auditing of the services in the neonatal intensive care unit is very essential and reduction of the neonatal mortality is a must, if the dream of achieving the 4th millenium development goal of reducing under 5 mortality by 2/3rd by 2015 can be attained.

Keywords: neonate, morbidity, mortality

INTRODUCTION

Neonatal period is the most vulnerable period of life due to different diseases, which in most cases are preventable (Bhutta, 1997).

In developing countries, death in the newborn period which is from 0 to 28days, account for 50-70% of infant mortality (Kingerberg et al., 2004). It is estimated that 4

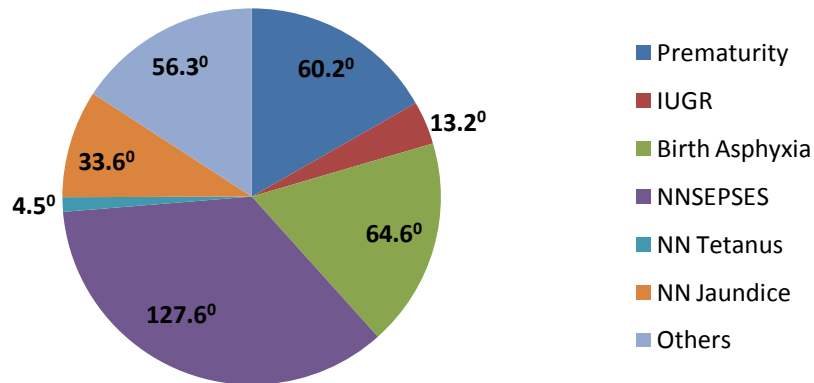


Figure 1. A pie chart showing diseases

million deaths occur in the newborn annually and 80% of such deaths occur in the first day of life (Lawn et al., 2005) Even in the United States of America, in a study by the advocacy group Saving the children and funded by Bill and Melinda Gates foundation, it found that 40% of preventable child death occur in the newborn period (US Today 2012). The survival of the newborns depend upon the care they receive (Yinger and Ransom 2003). In most tertiary institutions, a special unit is reserved for babies with illnesses in the neonatal period (Kingerberg et al., 2004) Considerable improvement in the survival of the newborn in advanced countries has been made but the morbidity and mortality are still high in developing countries (Ng, 2004). A report by the Save the child project published in the journal Health Policy and Planning, showed the number of newborn deaths in the past decade hasdropped by 17% from 2000 to 2012 in the UAS (USA Today). In advanced countries, the main causes of morbidity and mortality in the neonatal period are unpreventable causes such as congenital abnormalities. But in developing countries preventable causes such as infections, birth asphyxia and prematurity predominate (Jehan et al., 2009). The neonatal disease pattern is a sensitive indicator of the availability, utilization and effectiveness of mother and child health services in the community. Community based data are difficult to come by, so hospital based data most often are used to assess the burden of the problem. It is necessary to carry out neonatal audit regularly from time to time as disease pattern vary from place to place and even from time to time in the same place (Abbasi, 1995). In the Neonatal Unit Services Hospital in Lahore Pakistan for instance the audit is done yearly (Parkash and Das, 2005). The institution of neonatal care in Nigeria started in the late 60s and the use of incubators and special care units were introduced in a few centres (Disu) Ngeria has experienced worsenig of child mortality in the last decade. Infant mortality rate in 1990 was 87/1000 compared to 100/1000 live births in 2003 (Federal Ministry of Health, 2011). This study was undertaken to

assess the morbidity and mortality pattern in the Neonatal Intensive Care Unit of the Delta State University Teaching Hospital Oghara, Delta State of Nigeria which is the only teaching hospital in the state. This a two year prospective study from the hospital since its inception in January 2010 to December 2011.

MATERIALS AND METHOD

The records of all the newborns admitted into the newborn special care unit (NICU) were kept and information recorded included the date and time of delivery, age at presentation, the gender of the child, the address of the mother, mode and place of delivery prenatal information, perinatal history including the events surrounding the delivery and immediate neonal period. The patients were clerked and a clinical diagnosis made. Laboratoy investigations were done, and the diagnosis mordified based if necessary based on the result of the patient or clinical response to instituted therapy. All the treatment , including supportive treatment, were documented. The progress of the patient and eventual outcome following the management of the child were also documented.

RESULTS

A total of six hundred and forty six neonates were admitted in the newborn intencive care unit in the period under study, out of which three hundred and fifty were males and two hundred and ninety six were females, giving a percentage of 54.3% for males and 45.7% for females. The male to female ratio therefore approximately 1.2:1. Of these, one hundred and eight of the neonates were born prematurely, one hundred and sixteen had birth asphyxia, with neonatal sepsis being the cause in two hundred and twenty eight neonates. These are shown in figure 1. This is a pie chart showing the

Table 1. Showing the pattern of the neonatal sepsis

Disease	Number	Percentage
Presumed sepsis	108	47.4%
Culture-Proven	80	35.1%
In Combination With Other Illnesses	40	17.5%
Total	228	100%

Table 2. Showing other diseases apart from those in fig 1

Disease	Number	Percentage of others
1 Postdates	8	7.8%
2 Hypoglycaemia	4	3.9%
3 Congenital Malaria	6	5.9%
4 Posterior Urethral Valve	4	3.9%
5 Congenital Pneumonia	16	15.7%
6 Meconium Aspiration	10	9.9%
7 Transient Tachypnoea Of The Newborn	6	5.9%
8 Tetralogy Of Fallot	2	2%
9 Cystic Hygroma	8	7.8%
10 Aspiration Pneumonitis	8	7.8%
11 Macrosomia	4	3.9%
12 Gastroschisis	4	3.9%
13 Meningomyelocele	4	3.9%
14 Hypospadias	2	3.9%
15 Hypovolaemic Shock	2	3.9%
16 Respiratory Distress	2	3.9%
17 Necrotizing Enterocolitis	3	5.9%
Total	102	100%

Table 3. Showing the causes of death

Disease	Number	Percentage
1 Prematurity	30	22.6%
2 IUGR*	4	3.2%
3 Birth Asphyxia	32	24.1%
4 Neonatal Sepsis	34	25.7%
5 Neonatal Tetanus	4	3.2%
6 Neonatal Jaundice	12	9.1%
7 Others	16	12.1%
Total	132	100%

*IUGR: Intrauterine Growth Restriction

pattern of diseases.

Table 1 shows the pattern of neonatal sepsis. Of the two hundred and twenty eight presenting with neonatal sepsis, only eighty of them were culture proven. This gives a percentage of 35.1% of the cases diagnosed as neonatal sepsis. In one hundred and eight or 47.4% of these, the diagnosis was presumed sepsis and

responded to antibiotic therapy. In 40 or 17.5% of these neonates, the neonatal sepsis was in combination with other illnesses such as birth asphyxia etc.

One hundred and two of them had other illnesses apart from prematurity, birth asphyxia, intrauterine growth restriction, neonatal sepsis, neonatal tetanus, and neonatal jaundice. These other diseases are shown in table 2.

Of the six hundred and forty six neonates seen, one hundred and thirty two of them died, giving a mortality rate of 20.3%. Of these deaths, ninety two were males while forty were females, giving a male to female ratio of approximately 2.3: 1. The case fatality for males is 26.3% while that of females is 14.1%. Prematurity was the cause in thirty or 22.6% of the cases, while birth asphyxia was the cause in thirty two or 24.1% of the cases. Thirty four of the patients that died or 25.7% had neonatal sepsis. These are shown in table 3

The case fatalities are shown in figure 2, which shows that though there more deaths from neonatal sepsis than prematurity, but with a lower case fatality at 14.9% compared to that of prematurity at 27.8%. The highest case fatality was with neonatal tetanus with 50%.

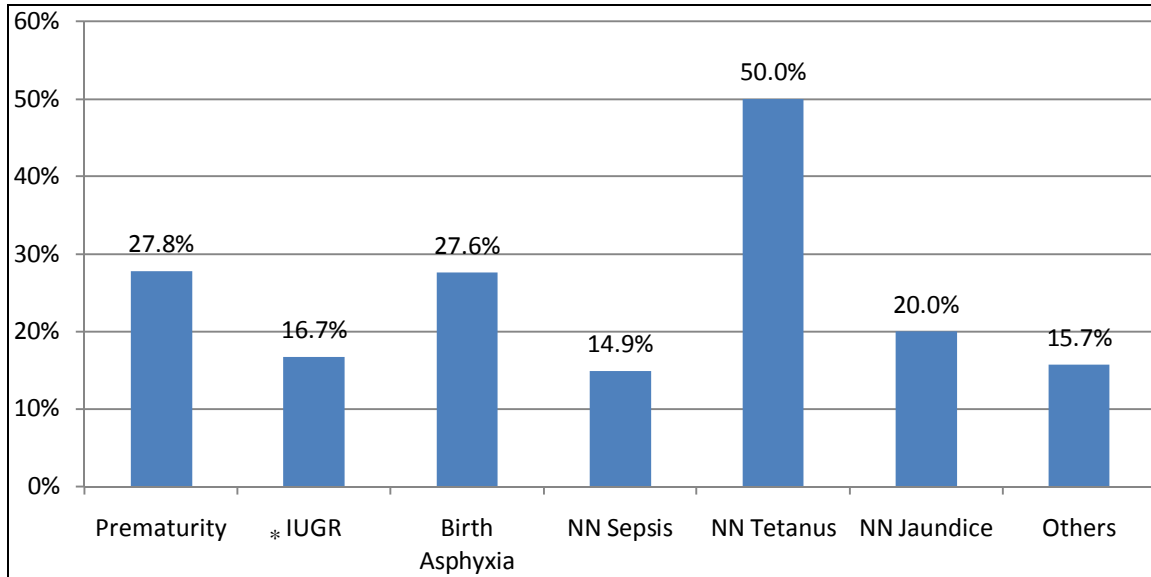


Figure 2. A bar chart showing case of fatality
*IUGR – Intra-Uterine Growth Restriction

DISCUSSION

A total of six hundred and twenty six patients were seen during the period under review. This is much lower than the number seen at Lahore Pakistan (Parkash and Das, 2005) and a far cry compared to a study in Tanzania where two hundred and forty six patients were seen under three months. One thousand five hundred and fifty four patients were seen within one year!(January to December 2006)10 but nearly similar to what was noticed in Bangladesh (Nadar et al., 2009). The relatively smaller number in our study is because the hospital is a very new one, commissioned in 2010. More males than females were seen in our study and its similar to that in Pakistan 8, Bangladesh (Nadar et al., 2009), Tanzania (Kingerberg et al., 2004). At Aminu Kano Teaching Hospital Kano, The male: female ratio was 1.25:1 in favour of the males (Mukhtar-Yola and Iliyasu, 2007) 54.3% of our patients were males in our study compared to 62.1% in Pakistan (Parkash and Das, 2005). Neonatal sepsis accounted for the highest number of admissions shown in figure 1. This may be due to the equally higher number of neonates with presumed sepsis compared with the culture proven cases. However in many developing countries, positive culture is obtained in less than half of the patients treated with neonatal sepsis. More often neonatal sepsis is diagnosed on clinical presentation especially in developing countries (Aurangzeb and Hammwd, 2003). Most of our patients diagnosed as presumed sepsis responded to antibiotics. At Aminu Kano Teaching Hospital, Birth Asphyxia accounted for the highest number of presentation at 27%, with Sepsis at 25.3% and prematurity at 16% (Mukhtar-Yola and Iliyasu, 2007).

The number with birth asphyxia was slightly higher than that for prematurity in our study. This is very different from what was observed in Bangladesh (Nadar et al., 2009). Prematurity was the highest at 60.7% in Bangladesh. The incidence in our study was higher than the experience in Pakistan at 16.5% (Parkash and Das, 2005) In that study too, birth asphyxia significantly ranked higher than prematurity at 24.3% , but much lower in Bangladesh (Nadar et al., 2009). Low birth weight (intrauterine growth restriction) was much higher in both Pakistan (Parkash and Das, 2005) and Bangladesh (Nadar et al., 2009) than in our study. This accounted for 40.54% in Pakistan and 48.2% in Bangladesh. In a study in Ife, Owa and colleague found that neonatal jaundice accounted for upto 45.6% of newborn admission (Owa and Osinaike, 2011), which at total variance with my finding.

The mortality rate in our study is 20.3% which is almost similar but slightly lower than the experience in Pakistan (Parkash and Das, 2005) but slightly higher than what was noticed in Tanzania at 19%2. This is about the same experience in Calabar Nigeria where overall mortality was 19.3% (Udo et al., 2009) It is also much higher than the observation in the Sultanate of Omar (Ajim et al.,) at 16.3% and at Vermot-Oxford Network in the United States of America at 17% (Boggs, 2011). This is because of inadequacies in developing countries ranging from lack of manpower to poorly equipped hospitals and infrastructural development (Bhutta, 1997). The death rate was higher in males with a male to female ratio of 2.3: 1. Even the case fatality ratio is higher in male than females at 26.3% and 14.1% respectively. This is the experience in other places. (Parkash and Das, 2005;

Mukhtar-Yola; Udo et al., 2009; Boggs, 2011) In Egypt however, prematurity and low birth weights were the leading cause of death (Campbel et al., 2004). Table 3 shows the caused of death and also the per centage of the condition of the over all mortality. Neonatal sepsis was the highest cause of death in this study at 25.7%. This also similar to the study in Calabar Nigeria at 27.4% (Udo et al., 2009) This is however at variance with the study in Bangladesh were prematurity accounted for 71.1% of the mortality (Nadar et al., 2009). Also in a study in Lagos Nigeria, Disu noted that prematurity accounted for 25% of deaths, birth asphyxia 26% and neonatal sepsis 34%, including neonatal tetanus and neonatal pneumonia (Federal Ministry of Health, 2011). Though neonatal sepsis was the highest contributor in our study, the case fatality as shown in figure 2 showed that neonatal sepsis was infact the lowest at 14.9%. This means that more premature babies actually died when compared to the number of such condition seen. Most of these deaths are preventable if there is a good maternal and child health service, which also the experience in Pakistan where over 60% of the causes of death are preventable (Parkash and Das, 2005). the case fatality ratio for prematurity is comparable to an earlier report on prematurity in Warri which is in the same Niger Dela (My study). In that study, the mortality rate for prematurity was 26% (Federal Ministry of Health, 2011). Birth asphyxia is the second commonest cause of death in this study. This is at variance with the study in Pakistan where birth asphyxia was the commonest cause at 41%. It was also among the major determinants of neonatal deaths as seen in Wesley Guild Hospital in Ilesha Nigeria (Onayade et al., 2006). In Kenya, birth asphyxia was the cause of deaths in 44% of cases which is much higher than what was obtained from the ststudy (Mwanik et al., 2010). Overall, over 98% of newborn deaths occur in developing countrie (Danstadt et al., 2005).

CONCLUSION

Neonatal deaths from decades to decades in Nigeria has shown no significant improvement but infact worsening situation. The reasons range from lack of man power to poor utilization of the health facilities. In fact two thirds of births in Nigeria occur at home (Federal Ministry of Health, 2011). This is hindering the prospect of achieving the 4th millenium development goal. Zupan J notes that it will be very difficult to achieve, without reduction in neonatal deaths, the millenium development goal 4, which reduction of under-5 mortality by two thirds in 2015 (Zupan, 2005). It is my hope that the 'Saving Newborn in Nigeria' will upturn this sad senerio and one of the must do is regular auditing and quality assesment of the various special care baby units in Nigeria. Infact Lancet

did a one yeatr audit of its neonatal surving series and highlighted sixteen simple and extremely cost-effective measures that could reduce neonatal mortality by 67% which includes regular auditing (Danstadt et al., 2005).

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