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A Study of Neonatal Admissions into a Newborn-Special-Care Unit

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Summary

Ibe BC, Ibeziako SN and Azubuike JC. A Study of Neonatal Admissions into a Newborn-Special-Care Unit. *Nigerian Journal of Paediatrics 1994;* **21** *: 20*. A retrospective study of newborn babies admitted over a period of six years into the Newborn-special-care Unit (NBSCU), Department of Paediatrics, University of Nigeria teaching hospital (UNTH), Enugu, was undertaken. The number of babies admitted was 5376 (2876 males, 2500 females). Babies of low birthweight (LBW) comprised 25.7 percent of the total admissions.There was a progressive annual increase in the admission of out-born babies, from 0.7 percent in 1982 to 21.4 percent in 1987. There were similar increases in the admission of babies of LBW from 17.3 percent in 1982 to 51.8 percent in 1987 and babies of very low birthweight (VLBW) from 3.1 percent in 1982 to 18.7 percent in 1987. Major indications for admission of the babies included birth asphyxia in 29.7 percent, prematurity and LBW in 25.7 percent and instrumental deliveries in 19.0 percent of the cases. The overall mortality was high at 10.5 percent of the cases; death among babies of LBW contributed to 79.6 percent of the overall mortality, the main causes being complications of prematurity in 43.0 percent and infection in 31.0 percent of the deaths. Suggested measures to reduce mortality, include expansion and modernization of existing basic infrastructures to prevent overcrowding, provision of essential equipment and increase in the number of staff of high quality in the Unit.

Introduction

ADVANCES in neonatal intensive care in the past two decades have resulted in marked reduction in perinatal mortality and morbidity, especially among infants of low birthweight.[1-4] One of the important measures that led to these advances was the regionalization of reproductive medical care.[5] Regionalization has led to availability and appropriate utilization of special medical facilities unique to reproductive medical care and improved research and learning in areas of reproductive medicine.[6,7] On the basis of this regionalization concept, a Newborn-Special-Care Unit (NBSCU) was established in 1975 at the University of Nigeria Teaching Hospital (UNTH), Enugu, so as to offer special care to at-risk and ill newborn babies. Since its incep-

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tion, the Unit has offered special care to both in-born and out-born infants from a catchment area of over 100 kilometres radius around Enugu. While several changes have occurred over the years, especially in respect of admission policies, no proper evaluation of the services has been undertaken. Thus, the present retrospective study of admissions into the NBSCU was carried out as part of an audit of the services of the Unit, with the primary objective of evaluating its performance and identifying areas that require improvement.

Patients and Methods

The medical records of all newborn babies admitted into the NBSCU over a period of six years (January, 1982 to December 1987), were reviewed. Information extracted from these records included sex, gestational age, birthweight, indications for admission, diagnosis and causes of deaths. The study also included the medical and nursing staffing of the Unit over the period 1975 - 1981 and 1987 and the available equipment during the period 1975 - 1987.

Results

During the six-year period of the review, 5376 babies (2876 males and 2500 females, ratio 1.2:1), were admitted into the NBSCU. As can be seen from Table I showing the yearly out-born admissions, there was a gradual drop in the total number of admissions from 1505 in 1982 to 991 in 1985 and a steep drop from 991 in 1985 to 402 in 1986 when admissions were rationalized and instrumental/surgical deliveries ceased to be indications for admission into the Unit. There was an appreciable increase (0.7 percent in 1982 and 21.4 percent in 1987) in the number of babies admitted from outside, the total number of such babies being 354 (6.6 percent) of the total admissions (Table I).

TABLE I

Yearly Admissions of 354 Out-born Babies

Year	*Total No of patients*	*No of Out-borns*	*Percent of Total*
1982	1505	10	0.7
1983	1007	19	1.9
1984	915	39	4.3
1985	991	93	9.4
1986	402	74	18.4
1987	556	119	21.4
Total	5376	354	6.6

The birthweight of the babies ranged from 600 to 6500 grams (Table II). Babies of low birthweight (BW≤ 2500 grams) comprised 1384 (25.7 percent) of the total admissions. As shown in Table III, the number of annual admissions of babies of low birthweight (LBW) increased from 261 (17.3 percent) in 1982 to 288 (51.8 percent) in 1987; similarly, the number of very low birthweight (VLBW) babies (BW≤ 1500 gm) totalled 398 (7.4 percent) of all the admissions and there was also an increase in their annual admissions from 47 (3.1 percent) in 1982 to 104 (18.7 percent) in 1987.

TABLE II

Distribution of Birthweights of 5376 Newborn Infants

Birthweight (gm)	*No of Babies*	*Percent of Total*
≤1000	43	0.8
1001 - 1500	355	6.6
1501 - 2000	418	7.8
2001 - 2500	568	10.6
>2500	3992	74.2
Total	5376	100.0

TABLE III

Yearly admissions of 1384 Babies of LBW and 398 Babies of VLBW

Year	*No of Admissions*	*No of LBW*	*No of VLBW*
1982	1505	261(17.3)	47(3.1
1983	1007	173(17.2)	38(3.8)
1984	915	195(21.3)	45(4.9
1985	991	243(24.5)	81(8.2)
1986	402	224(55.6)	83(20.6)
1987	556	288(51.8)	104(18.7)
Total	5376	1384(25.7)	398(7.4)

Figures in parentheses represent percent of total
LBW = Low birthweight
VLBW = Very low birthweight

The gestational age (Table IV) of 29 babies (0.5 percent) was 27 weeks or under, while it was 37 weeks or over in 3704 (68.9 percent) babies. Using the birthweight charts designed by us, [8] 657 (47.5 percent) of the 1384 LBW infants were appropriate-for-gestational-age (AGA) and 727 (52.5 percent) were small-for-gestational-age (SCA).

The commonest and major indications for admission included birth asphyxia (including meconium aspiration syndrome) in 1594 (29.7 percent) of the 5376 patients, prematurity and LBW in 1384 (25.7 percent) and instrumental deliveries/Caesarian section in 1021 (19.0) percent) of the admissions. Less common indications were infants of Rhesus negative mothers comprising 563 (10.5 percent), congenital malformations in 126 (2.3 percent)and a miscellaneous group (infants of diabetic mothers, maternal illness or death etc) in 688 (12.8 percent) of the admissions. It should be noted that some of the babies were admitted for more than one reason.

There were 564 deaths (10.5 percent) of the total number of admissions (Table V). As can be seen, the annual mortality rate rose from 124 (8.2 percent) in 1982 to 120 (29.9 percent) in 1986 and 115 (20.6 percent) in 1987. It is evident, that the higher rates in 1986 and 1987 were due to the increased numbers of admissions of out-born babies, LBW and VLBW babies in the period 1986-87.

TABLE IV

Distribution of Gestational Age of 5376 Babies

Age (Weeks)	*No of Babies*	*Percent of Total*
≤ 27	29	0.5
28 - 30	218	4.0
32 - 33	589	11.0
34 - 36	836	15.6
≥ 37	3704	68.9
Total	5376	100.0

TABLE V

Yearly Admissions and Mortality Among 5376 Newborns

Year	*No of Babies*	*No of Deaths*	*Percent of Total*
1982	1505	124	8.2
1983	1007	57	5.7
1984	915	63	6.9
1985	991	85	8.6
1986	402	120	29.9
1987	556	115	20.6
Total	5376	564	10.5

In Table VI which shows the annual mortality rates among LBW babies, there were 449 (79.6 percent) deaths among these LBW babies out of the 564 deaths in the entire series. The main causes of death included prematurity and its complications (respiratory distress syndrome, apnoea etc) which occurred in 243 (43.0 percent), sepsis in 175 (31.0 percent), asphyxia in 68 (12.1 percent), congenital malformations in 28 (5.0 percent), neonatal jaundice in 11 (2.0 percent) and miscellaneous cases in 39 (6.9 percent) of the 564 deaths.

TABLE VI

Yearly Mortality Rates Among Babies of LBW

Year	*Total No of Deaths*	*No of LBW*	*Percent of Total*
1982	124	93	75.0
1983	57	36	63.1
1984	63	51	80.9
1985	85	69	81.1
1986	120	100	83.3
1987	115	100	86.9
Total	564	449	79.6

LBW = Low birthweight

At the establishment of the NBSCU in 1975, there was only one consultant paediatrician who was later joined by the second consultant in 1981. The position of the senior registrar was similar to that of the consultant until 1982 when the number increased to two. Between 1975 and 1982 there were only two registrar/senior house officers, while between 1982 and 1987, the number increased to between three and five. The number of senior nursing personnel was two in the 1975/81 period, increasing by one to three in the 1982/87 period; the number of other nursing staff has remained at three for the entire period 1975 to 1987.

Essential equipment, including apnoea monitors, automated mechanical ventilators, modern incubators etc. throughout the period under review, have been conspicuously lacking. The few available incubators have been in use since 1975 and these have deteriorated over the years, as there is no satisfactory repair and maintenance services for them.

Discussion

One of the clearly outstanding findings in the present series was the appreciable and progressive annual increase in the admission of out-born babies from 0.7 percent in 1982 to 21.4 percent in 1987 of the total admissions. A similar increase in the admission of babies of LBW from 17.3 percent in 1982 to 51.8 percent in 1987, as well as that of the VLBW babies from 3.1 percent in 1982 to 18.7 percent in 1987 could well be explained, in part, by our admission policy change that began that year and which emphasized admission priority of in-born premature and LBW infants; the increase in admissions of the out-born babies could be attributed to increased awareness of our newborn-care facilities by the community.

The overall mortality of 10.5 percent in the present study was unacceptably high. The contribution of 79.6 percent by babies of LBW to this overall mortality was an equally important finding. There seems to be no doubt that this high mortality was due to a number of factors including low standard of available services, the complications of prematurity (respiratory distress syndrome, apnoea etc) which accounted for 43.0 percent of the deaths, and infection which contributed 31.0 percent of the total number of deaths. Unfortunately, our Unit, has several peculiar problems, the most serious being com-

plete lack of such essential equipment as ventilators. Thus, the Unit which was originally conceived as a well-equipped regional centre for intensive care of newborn babies, is at best, offering intermediate-level care.

It is quite clear to us that, perinatal/neonatal care, as currently practized in Europe and America, [9-11] is prohibitively expensive for our country; such expenditure may be unjustifiable in any of the developing countries with limited resources for health-care in general. However, since good perinatal/neonatal care decreases mortality and morbidity, leading to a net-gain of surviving healthy children, [12 13] with the consequent socio-economic benefits, some measures still need to be undertaken in the developing countries in order to improve the care of these babies.

Measures that are needed for improved care of newborns include expansion of basic infrastructure to prevent overcrowding and thus reduce the risk of infection, as revealed in the study by Haley and Bregman.[14] Regionalization remains the best option for developing countries, drawing from the experiences of developed countries and especially noting the modifications as suggested by Kanto.[11] There should be available funds for the purchase of essential equipment and maintenance of existing ones. To ensure durability of these equipment, a preventive maintenance programme should be instituted. Improvement in the number and quality of the staff of the Unit is needed so as to prevent overwork which tends to generate undue stress.[15] Meaningful administrative measures should be taken to improve staff morale. Paediatric specialist staff involved in perinatal/neonatal care in developing countries must be prepared, through research, to continually adapt, improvise and optimise available facilities for the benefit of the babies under their care. In this regard, the experiences of Ferrara and Johnson [16] in India and the selective interventions suggested by Dawodu and Effiong [17] in Nigeria, are noteworthy. There may be need to further rationalize admissions by keeping the NBSCU solely for intensive care of predominantly premature low birthweight infants who often require life support equipment.

The present findings from an institutionally-based study may not reflect accurately the situation in the entire population, but, as has been shown in other similar studies,[18-20] they do point to the major causes of neonatal morbidity and mortality and may assist in formulating policies that could improve the quality of the services. In addition, Stewart and Reynolds [21] have pointed out that regular reviews of neonatal statistics, within an institution, are a reliable way of assessing the success or failure of changes in the methods of perinatal and neonatal care. The measures that have been suggested here will, no doubt, enhance the performance of our neonatal services and ultimately improve the mortality statistics which are, at present, unacceptably high.

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References

1 Thompson T and Reynolds J. The results of intensive care therapy for neonates. I. Overall neonatal motality rates. II, Neonatal mortality rates and longterm prognosis for low birthweight neonates. *J Perinatal Med* 1977; 5:59 - 75.

2 Yu VYH and Hollingsworth E. Improving prognosis for infants weighing 1000gm or less birth. *Arch Dis Child* 1980; 55: 422-6.

3 Stewart AL, Raynolds EOR and Lipscom AP. Outcome of infants of very low birthweight. Survey of World Literature. *Lancet* 1981; **1**: 1038-40.

4 Yu VYH, Orgill AA, Bajuk B and Astbury J. Survival and 2-year outcome of extremely preterm infants. *Br J Obstet Gynaecol* 1984; 91: 640-6.

5 Sawyer PR. The organisation of perinatal care with particular reference to the newborn. In: Neonatology, Pathophysiology and Management of the New born. Avery GB, ed 2nd Edition *JP Lippinocott Co.* (Publishers) 1981: 17-47.

6 Williams RL.Measuring the effectiveness of perinatal medical care. *Med Care* 1979; 95.

7 Mc Cormick MC, Shapiro S and Starfield BH. The regionalization of perinatal services. Summary of the evaluation of a national demonstration programme.*JAMA* 1985; **253**: 799-804.

8 Ibe BC and Azubuike JC. Birthweights of preterm Nigerian infants of 26-36 weeks gestation. *Annals Trop Paediatr* 1990; **10:** 27-9.

9 Ebrahim GJ. Care of the Newborn. *Br Med J* 1984;**289**: 899-901.

10 Bloom B. Changing infant mortality.The need to spend more while getting less. *Pediatrics* 1984; **73** 862-6.

11 Kanto WP.Regionalization revisited (Editorial). *Amer J Dis Cild*1987; **141**: 403-4.

12 Hagbery B, Hagberg G and Olow I. The changing panorama of cerebral palsy in Sweden: IV. Epidemiological trends 1969-78 *Acta Pediatr Scand* 1984; **73**:433-40.

13 Ohlsson A. Better perinatal care in Saudi Arabia. *Annals Saudi Med* 1985; **5**: 169-78.

14 Haley RW and Bregman DA. The role of understaffing and overcrowding recrurrent out-breaks of staphylococcal infections in Neonatal Special Care Unit. *J Inf Dis* 1982; **145**: 875-85.

15 Walker CHM. Neonatal intensive care and stress. *Arch Dis Child* 1982; **57**:85-8.

16 Ferrara B and Johnson DE. Intensive care for high-risk infants in Calcutta. Efficacy and cost. *Amer J Dis Child* 1986; **140**: 885-8.

17 Dawodu AH and Effiong CE. Neonatal mortality effects of selective paediatric interventions. *Pediatrics* 1985; **75**: 51-7.

18 Meme JE. A prospective study of neonatal deaths in Nairobi, Kenya. *East Afr Med J* 1978; 55: 262-7.

19 Spark B and Lowry MF. Neonatal deaths at the University Hospital of the West Indies. *West Ind Med J* 1978; **27**: 130-6.

20 Dawodu AH and Effiong CE. Neonatal morbidity and mortality among Nigerian infants in a special- care-baby-unit. *East Afr Me J* 1983; 60: 39-45.

21 Stewart AL and Reynolds EOR. Improved prognosis for infants of very low birthweight. *Pediatrics* 1974; **54**: 724-35.