

Factors affecting the survival of the "at risk" newborn at Korle Bu Teaching Hospital, Accra, Ghana

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Summary

High risk pregnancies continue to be associated with high perinatal mortality and morbidity in developing countries. Korle Bu Teaching Hospital is no exception with a perinatal mortality rate of 98.7/1000 births.

Multiple factors resulting in this include the high risk nature of the pregnancies resulting in increased incidence of premature deliveries and asphyxiated babies, the delay in transfer of the sick neonate as well as the inadequate mode of transfer. The type of delivery other than the spontaneous vaginal route also affects the outcome, though the relationship was not statistically significant. Logistic regression analysis showed that maturity, birthweight and time from birth to admission to NICU were the most significant factors associated with the survival of the neonate.

Proper foetal surveillance both in the antenatal period and during labour cannot be over emphasized and the mere presence of a paediatrician at these high risk deliveries may make a difference. Also, increased vigilance in the special care offered will help reduce mortality.

Keywords: Perinatal deaths, Prematurity high risk factors.

Résumé

Des grossesses à haut risque continuent à être associées à une mortalité et morbidité périnatales élevées dans des pays en développement. Korle-Bu Teaching Hospital ne fait pas exception avec un taux de mortalité périnatale de 98,7/1000 naissances.

De multiples facteurs qui les causent, y compris une nature à haut risque de grossesses résultants à des incidences élevées des accouchements prématurés et des bébés asphyxiés, le retard de transfert des nouveaux-nés malades ainsi que des moyens insuffisants de transfert. Le mode d'accouchement autre que la voie vaginale spontanée a aussi un effet sur les résultats, bien que la relation n'ait pas été statistiquement importante. Une analyse de régression logistique a montré que la maturité, le poids à la naissance et la période de naissance à l'entrée à NICU étaient les facteurs les plus importants qui sont associés à la survie des nouveaux-nés.

Une surveillance foetale adéquate pendant la période prénatale et celle des contractions ne saurait être soulignée et la simple présence d'un pédiatre. Au cours de ces accouchements à haut risque peut faire une différence. En outre une vigilance dans le soin spécial offert, peut aider à réduire la mortalité.

Introduction

Pregnancies associated with perinatal morbidity or mortality are considered high risk and their identification is an essential component of obstetric care. They may result in intrauterine foetal death, intrauterine growth retardation, congenital abnormalities, excessive foetal growth, birth asphyxia, pre or

post maturity, neonatal disease or the long term effects of cerebral palsy and mental retardation. Such babies born are considered to be "at risk" neonates and make up approximately 10-20% of high risk deliveries.

These neonates are at great risk of dying in spite of adequate neonatal care resulting in high (greater than 50%) perinatal mortality and morbidity.

At the Korle-Bu Teaching hospital, the premier hospital in Ghana and also a tertiary referral centre, where there are approximately 12000 deliveries a year, all "at risk" neonates are admitted to the Neonatal Intensive Care Unit (NICU) for specialised care. Babies from other medical facilities in the nearby vicinity are also admitted to NICU. The average number of admissions per year is 2500. In NICU, "specialised care" in the form of incubator nursing, intravenous fluid therapy, antibiotics, nasogastric feeding and limited respiratory support with intermittent ambu bagging and oxygen therapy is offered. (there are no facilities presently for mechanical ventilatory support).

The mortality rate of the unit ranges between 20% to 30% while Korle-Bu Teaching Hospital (KBTH) has a perinatal mortality rate of 98.7/1000 live births¹. This is unacceptably high mortality with multifactorial reasons, therefore the need to search for contributory aetiological factors.

This study was undertaken to try and identify these factors which add to the increased mortality of the neonates so that steps can be taken to try and reduce the high mortality of the "at risk" neonate.

Methodology

The admission and discharge registers of the neonatal intensive care unit (NICU) for 1995 were used as the source of information. The variables collected included the (i) registration number of the child, (ii) the sex, (iii) the time of delivery, (iv) the birthweight, (v) time baby was received at NICU, (vi) the weight as measured at NICU, (vii) the place of delivery, (viii) the mode of delivery, (ix) the diagnosis, (x) the outcome of delivery, and (xi) the outcome of management. The information was entered into a computer using the Dbase IV statistical package and analysed with SSS statistical packages.

Statistical tests of association were done on the relevant variables to determine the role of the various factors on the survival of the babies at NICU.

Results

A total of 2497 babies were admitted to the Neonatal Intensive Care Unit (NICU) during the period under consideration (1995).

Tables 1, 2, and 3 look at some of the risk factors contributing to poor survival.

Multinomial regression analysis showed that the age and parity of the mother and the time interval between birth and admission to the ward were not important factors related to the survival of the neonate admitted to NICU. However, gestational age, birth weight, type of delivery and place of birth were sig-

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Table 1 Mortality and major risk factors (mother and mode of delivery)

Risk factors	Total Cases	Total Deaths	Percentage	Significance P-value
Age of mother				P = 0.09
<20 yrs	222	55	24.8	
20 - 29	1194	312	26.1	
30 - 39	701	148	21.1	
40 - 49	55	15	27.3	
Parity of mother				P = 0.01
0 - 1	1426	348	24.1	
2 - 5	800	183	22.9	
5+	69	20	29.0	
NA	202	69	34.2	
Mode of delivery				P<0.001
Spontaneous vertex	1600	438	27.4	
Breech	41	14	34.1	
Caesarean section	674	133	19.7	
Instrumental	109	13	11.9	
Not stated	73	-	-	
Place of delivery				P<0.001
Korle Bu hospital	2080	464	22.2	
Other hosp/polyclinic	140	56	40.0	
Maternity home	79	34	43.0	
Home or taxi	80	31	38.8	
Not stated	118	-	-	

Table 2 Mortality and major risk factors (foetus/baby)

Risk factors	Total Cases	Total Deaths	Percentage	Significance P-value
Time taken to reach ward (since birth)				P = 0.09
0 - 30 minutes	174	79	45.4	
31 - 90 minutes	1130	263	23.3	
1.5 hours - 72 hours	603	148	24.5	
72+ hours	196	37	18.9	
Not stated	394	-	-	
Gestational age, weeks				P<0.001
<28	382	206	53.9	
28 - 32	360	96	26.7	
33 - 37	794	142	17.9	
38 - 42	818	116	14.2	
NA	143	-	-	
Sex of child				P>0.05
Female	1094	269	24.6	
Male	1396	349	24.6	
Weight of child				P<0.001
<- 1.0	128	107	83.6	
1 - 1.4	381	171	44.9	
1.5 - 1.9	483	84	17.4	
2.0 - 2.49	240	46	19.2	
2.5 - 2.99	339	53	15.6	
3.0 - 3.99	537	61	11.4	
4+	192	11	5.7	

Table 3 Diagnosis and case fatality rate for the neonates admitted to NICU

Disease condition	Total Cases		Total Deaths		Case fatality Rate
	No.	%	No.	%	
Short gestation (prematurity)	1086	(44.2)	392	(64.8)	36.1
Long gestation	152	(6.2)	1	(0.2)	0.7
Birth asphyxia	442	(18.0)	114	(18.8)	25.8
Respiratory distress	415	(16.9)	59	(9.8)	14.2
Bacterial sepsis	18	(0.7)	4	(0.7)	22.2
Neonatal haemorrhage	22	(0.9)	5	(0.8)	22.7
Neonatal jaundice	79	(3.2)	2	(0.3)	2.5
Pulmonary haemorrhage	10	(0.4)	1	(0.2)	10.0
Congenital abnormality	37	(1.5)	8	(1.3)	21.6
Other circulatory problem	26	(1.1)	4	(0.7)	15.4
Twitching	11	(0.4)	0	-	-
Pyrexia of unknown origin	10	(0.4)	0	-	-
Others	151	(6.1)	24	(4.0)	15.9
Total	2459		605		

Table 4 Logistic regression factors and level of significance

Factors	B	Wald	Sig.	Exp(B)
Mothers age < 20 years	-.077	.143	.705	.926
Maturity < 32 weeks	-.955	35.377	.000	.385
Mode of delivery	-.041	.085	.770	.960
Place of delivery	.448	5.156	.023	1.565
Time from birth to admission to NICU	-1.065	27.932	.000	.345
Birth weight	-.640	12.364	.000	.527
Disease type	-.002	.009	.924	.998
Sex of neonate		1.715	.424	

nificantly associated to the survival of the newborn.

Logistic regression analysis (table 4) also confirmed the above observation.

Discussion

This study draws attention to the high mortality rate in the neonatal unit of Korle-Bu Teaching Hospital (KBTH), where all 'at risk' inborn neonates are admitted as well as neonates from the surrounding environs. Low gestational age i.e. prematurity especially less than 28 weeks was a major factor contributing to the death of the neonates as seen in other studies^{1,2,3}. From E. Tette's⁴ study from the same unit, no patient born less than 28 weeks of gestation survived. Such infants usually died from the respiratory problems of prematurity without assistance from mechanical ventilation. Of great significance is also the close association of mortality to birthweight. As seen from table 2, out of the 128 babies who weighed less than 1kg, 83.6% of these died whilst there were less deaths with increasing size beyond 2kg. The need to improve antenatal care, which could lead to prevention of some of these births, cannot be over emphasised.

Both maternal parity and maternal age were not found to be statistically significant in contributing to the neonatal deaths. The mode of delivery of babies affected the eventual outcome. Obviously, the 27% of babies who required caesarian section were at risk to start with and so were those delivered by breech or assisted instrumentation. Deaths associated with the mode of delivery were however not found to be statistically significant when other factors were considered together.

Babies inborn in KBTH arriving in NICU had a better chance at survival (87.8%) compared to babies born outside the Korle-Bu Teaching Hospital with 60% survival rate. The reason may not be due to the immediate transfer of the neonates since babies transferred to the NICU within 30 minutes were more likely to be sickest and therefore had the highest mortality rate. The delay in the transport of the neonate from the health facility as well as the inappropriate mode of transportation may together have adverse outcome on survival. A number of babies are brought in taxis or private vehicles with no proper care for keeping babies warm, no oxygen delivery en route and poor handling. This indeed compromises the already compromised neonate affecting its chance of survival. Among such are those who are born at home or en route to the hospital in taxis (i.e. Born before the arrival BBA). Other studies have found a higher perinatal mortality rate among at-risk babies born outside the hospitals^{5,6,7}. It was obvious that a number of mothers did not know the signs of labour therefore the delay in getting into hospital⁵. Signs and symptoms of labour need to be emphasised during antenatal visits.

From table 3, deaths from birth asphyxia (25.8%) continued to rank only second to prematurity or low birthweight (36.1%) as a major cause of neonatal mortality as in other studies^{3,4,7}. This certainly suggests taking another look at foetal surveillance during labour, by improving labour ward staffing with skilled personnel day and night; competent labour monitoring and early interventions in cases of foetal distress. The presence of a paediatrician at the delivery of high risk cases could help identify and reduce the risks of severe birth asphyxia as was seen in a study at Ibadan, Nigeria. Other important causes of neonatal death were sepsis, respiratory distress and haemorrhage from various causes.

Conclusion

Prematurity and very low birth weight continue to be important determinants of neonatal mortality contributing to the high mortality of 30% in the unit. Delay in transferring neonates at risk also affect the eventual outcome so as the mode of delivery. Prompt transfer of preferably the 'at risk foetus' (i.e. baby in mother's womb) may be a better option of management at the periphery to enable the mother deliver close to a special care unit where prompt intervention will be more readily available. Clinic education must therefore emphasise signs and symptoms of labour and problems when imminent. Also pe-

peripheral health facilities must transfer at risk neonates promptly and properly to minimize morbidity. As much as possible the presence of a paediatrician to assist with resuscitation at delivery must be sought at all high risk deliveries to reduce mortality.

With increased vigilance in special care offered in a neonatal unit such as this i.e. appropriate and adequate antibiotic therapy, aseptic techniques, oxygen by face mask or nasal prongs, intermittent ambu bagging, fluid and electrolyte support and nutritional support, it is hoped that neonatal wastage could be curtailed. As and when mechanical ventilation becomes available it may be possible also to salvage a lot more babies with respiratory distress requiring assistance.

This retrospective study suffered from some incomplete data. We hope to conduct a prospective study soon to add to the findings above.

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