Pediatric Oncall Journal

DOI: https://doi.org/10.7199/ped.oncall.2025.56

ORIGINAL ARTICLE

DETERMINANTS OF SURVIVAL OF EXTREME PREMATURITY AT THE GYNAECO-OBSTETRIC AND PAEDIATRIC HOSPITAL OF YAOUNDÉ, CAMEROON

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ABSTRACT

Introduction: The aim of our study was to determine the frequency and factors influencing the survival rate of newborns less than 28 weeks of amenorrhoea.

Methodology: This was a retrospective descriptive study including new-borns of less than 28 weeks amenorrhoea at the Yaoundé Gynaeco-Obstetric and Paediatric Hospital, between January 2015 and December 2020.

Results: During the study period, 209 extreme preterm infants were included. The overall survival rate was 32.5%. The mortality rate was 100% in those less than 25 weeks amenorrhoea. The main comorbidities were respiratory distress (92.8%), anaemia (51.2%), jaundice (33%) and neonatal infection (24.4%). The factors that significantly influenced the survival rate were: the mother's marital status and level of education, gestational age ≥25 weeks amenorrhoea, time to immediate care (less than one hour), and initiation of the kangaroo mother method before 12 days of life.

Conclusion: In urban Cameroon, the survival rate of extremely premature babies is low, with viability starting after 25 weeks amenorrhoea. Survival could be improved by modifying certain risk factors.

ARTICLE HISTORY

Received 05 June 2024

Accepted 15 January 2025

KEYWORDS

extreme prematurity, determinants; survival

Introduction

Neonatal mortality worldwide is responsible for almost half of all deaths in children under the age of 5, with an estimated burden of 2.6 million per year.[1] Of these children, 80% are born at low birth weight (<2500 g) or preterm (<37 weeks).[1] Although extremely premature newborns (<28 weeks) represent a relatively small proportion (nearly 1%) of all live births, they are responsible for nearly half of all neonatal deaths and infant mortality.[2] Infants are predisposed to a higher rate of morbidity which, if anticipated and managed in time, can contribute to their long-term survival.[3]

Ensuring their survival is a challenge. Although there has been a phenomenal improvement in the survival of extremely premature(EPs) babies in developed countries, their survival in developing countries remains poor because of the inadequacy of the technical facilities dedicated to the management of these newborns, who are at high risk of immediate complications.[4]

There is little literature on the mortality and morbidity of extremely premature newborns in low-income countries. In a 2015 study in Yaoundé, Njom Nlend et al found that 23.0% of extremely preterm infants were discharged alive from the neonatal unit.[5] The aim of our work was to determine the frequency and factors influencing the survival rate of extremely premature newborns in our context, despite the difficulties encountered, in one of the referral neonatal units in the city of Yaoundé.

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Methods & Materials

This was a retrospective descriptive and analytical study based on the records of newborns less than 28 weeks amenorrhoea (WA) at birth, admitted to the neonatal unit of the Gynaecological-Obstetric and Paediatric Hospital (HGOPY) between 1 January 2015 and 31 December 2020. We consulted neonatal unit admission registers and the records of newborns admitted during the study period. Newborns who died before admission or were discharged against medical advice, as well as those whose medical records were incomplete and unusable, were not included. The variables studied in the newborns were: gender, birth weight, gestational age, use of resuscitation manoeuvres in the delivery room, length of hospitalisation and pathologies during hospitalisation. The variables studied in the mother were: age, profession, marital status, education, mode and place of delivery, and pregnancy follow-up (number of antenatal visits).

The data were analysed using Statistical Package for Social Sciences (SPSS) version 16.0. Continuous

Table 1. Neonatal factors affecting survival.

Variables	Frequency	Hospital trends		P value	OR (IC 95)
		Survivors (Survival rate %) n=68	Deceased (Death rate %) n=141		
Gender					
Male	89	8 (8,9)	81 (91,1)	0,05	0,64 (0,15-2,61)
Female	120	60 (50,0)	60 (50,0)		
Gestational Age					
<25 WA	7	0 (0,0)	7 (100)	<0,01	0,90 (0,36-1,90)
[25-27 WA]	121	35 (28,9)	86 (71,1)	<0,01	0,21 (0,20-2,57)
[27-28 WA]	81	33 (40,7)	48 (59,3)	0,143	1,85 (0,56-3,87)
Birth Weight					
[500-750 g]	65	6 (9,2)	59 (90,8)	10,039	1,33 (0,56-6,12)
[750 -1000 g]	92	41 (44,6)	51 (55,4)	0,03	0,68 (0,46-2,64)
[1000 – 1250 g]	34	15 (44,1)	19 (55,9)	0,103	0,11 (0,09-1,22)
=1250 g	18	6 (33,3)	12 (66,7)	0,076	0,60 (0,03-13,58)
Place of birth					
YGOPH	110	45 (40,9)	65 (59,1)	<0,01	1,59 (0,23-4,11)
Others centers	99	23 (23,2)	76 (76,8)		
Time to take charge					
<1 hour	56	42 (75,0)	14 (25,0)	0,01	0,32(0,14-3,66)
Between 1 and 2 hours	76	20 (26,3)	56 (73,7)	0,080	1,41(0,27-7,28)
Between 2 and 3 hours	45	6 (13,3)	39 (86,7)	0,019	1,52 (0,36-1,73)
>3 hours	32	0 (0,0)	32 (100,0)	0,02	0,98 (0,55-2,30)
Beginning of the kangaroo mother method					
<12 days	51	51 (100,0)	0 (0,0)	0,01	0,40 (0,21-8,14)
=12 days	158	17 (10,8)	141 (89,2)		

Maternal factors influencing extremely premature survival were marital status, level of education and completion of antenatal consultations (Table 2).

Table 2. Maternal factors influencing survival.

Variables	Hospital trends		P value	OR (IC 95)
	Vivants (n=68)	Décédés (n=141)		
Marital status				
Marrried	45 (66,2) 36,9	77 (54,6) 63,1	0,03	0,58 (0,31-2,80)
Single	23 (33,8) 26,4	64 (45,4) 73,6		
Level of education				
= Secondary	58 (85,3) 39,7	88 (62,4) 60,3	0,01	0,29 (0,15-6,90)
Higher	10 (14,7) 15,9	53 (37,6) 84,1		
ANC performed				
Yes	66 (97,1) 41,5	93 (65,9) 58,5	0,01	0,96 (0,44-6,43)
No	2 (2,9) 4,0	48 (34,1) 96,0		

The neonatal factors associated with survival were birth at the YGOPH, initiation of mother-kangaroo care before 12 days of hospitalisation and a delay in care of less than one hour. Factors associated with death were gestational age less than 25 WA and birth weight <750 g (Table 1).

The most common morbidities were respiratory distress (92.8%) and anaemia (51.2%). The average length of stay for survivors was 58 days (extremes: 1-60 days). (Table 3).

Table 3. Complications during hospitalisation.

Pathologies	Frequency	Percentage (%)
Neonatal infection	51	24,4
Respiratory distress	194	92,8
Jaundice	69	33,0
Haemorrhage Syndrome	15	7,2
Aneamia	107	51,2

variables were expressed by their mean ± standard deviation and discontinuous variables by their absolute and relative frequencies. The Chi2 test was used to establish statistical associations between variables. The Fisher test was used to compare means. Odds ratios were determined for certain variables in order to identify risk factors for death or protective factors against death. The significance threshold was defined as $p < 0.05$. We obtained research authorisations from the Institutional Ethics and Research Committee of the Faculty of Medicine and Biomedical Sciences of the University of Yaoundé I and from the Yaounde Gynaeco-Obsteric and Pediatric Hospital (YGOPH).

Results

During our study period, 3845 premature newborns were admitted to the neonatal unit of the YGOPH, 217 (5.6%) of whom were extremely premature. Eight files deemed unusable were excluded; the final sample consisted of 209 files. The sex ratio male was 0.74. The mean gestational age was 26 weeks amenorrhoea ± 3 days (extremes: 22 WA and 27 WA+6 days). The mean birth weight was 812 ± 0.46 g (range 500 and 1250 g). Concerning the place of birth, 52.6% of the extremely prematures were born at the YGOPH maternity (Table 1).

Of the 209 extremely premature babies included, 68 were discharged alive from the neonatal unit, corresponding to an overall survival rate of 32.5%. There were no survivors of less than 25 WA and 6 survivors of less than 750 g. The survival rate was 22.5% for those weighing less than 1000g. Survival rates by sex, weight, gestational age and gender are shown in Table 1.

Discussion

Our results show high morbidity and mortality in premature babies under 28 WA, as reported in the literature.[6] The overall survival of extremely premature babies (less than 28 WA) in our study was lower than in developed countries, where overall survival varies from 75 to 89%, whereas we found 32.5% of survivors.[3] Njom Nlend et al reported 23% in those under 28 WA.[5] Our values were comparable to most of the data from developed countries before the systematic use of surfactant. Kitchen et al reported survival rates of 35% in their 1977-82 cohort, rising to 47% in their 1985-87 cohort.[7] As Chiabi et al reported in 2013, efforts are still needed in the field of therapeutic modalities which are essential measures in the management of extreme premature infants but which are not yet available in Cameroon, in particular assisted ventilation and artificial surfactant.[4] It has been shown that the initiation of continuous positive airway pressure or the early administration of surfactant to extremely premature babies in the delivery room could reduce the risk of respiratory distress syndrome, which was our main complication (92.8%) during the hospital stay, as in Norman et al[8] study, where the incidence of respiratory distress was 60%.[8]

Our survival rate for infants weighing more than 750 grams was a reassuring result for a developing country, where expensive modalities such as surfactant may not be available for all preterm newborns and 43.1% of new-borns in this category can be saved without the use of surfactant. In the context of a developing country, neonates weighing less than 750 g continue to constitute a high-risk group, with barely one in 11 surviving to hospital discharge, despite the same efforts and resources as for infants weighing more than 750 g.

Like Chiabi et al, we found that gestational age influenced the survival of these newborns.[4] In fact, an increase in gestational age reduced the risk of death. The most frequent age group in our study was over 25 WA, which could be explained by the fact that a significant number of babies under 25 WA died in the delivery room. In addition to this, there were no survivors in the under 25 WA. This raises the problem of the limit of viability, which could be set at 25 WA in our context. In addition, a weight greater than 750 g favoured better survival of these premature babies.

The World Health Organisation (WHO) recommends that a woman should have her first prenatal consultation before the twelfth week[9] but in our study, 23.9% of mothers who had not had any prenatal consultation. Having at least one antenatal visit influenced survival. In the 2018 Cameroon demographic survey, it was reported that antenatal care by a doctor increased markedly with women's level of education, ranging from 3% among women with no education to 68% among those with a higher level of education, as did birth attended by trained personnel (32% versus 99%).[10] This could explain, on the one hand, the link we found between the mother's level of education and the survival of these newborns and, the association between place of birth and survival.

The majority of neonatal deaths occurred in children born outside our hospital and had to be referred. Thus, a postnatal transfer increased the risk of death. This result was similar to that of Mah and Noukeu, who explained it by the poor conditions in which the newborn was transported to the facility, increasing the risk of hypothermia, hypoglycaemia and infection, which were all causes of death.[11,12] The policy of systematic in-utero transfer in the face of recognition by healthcare staff of high-risk pregnancies could indirectly help to reduce mortality in this population.[13] This intra-mural birth would also encourage immediate neonatal care within a short timeframe. In fact, we found that an

initial care delay of less than one hour favoured a better survival rate, hence the need for in utero transfer for optimal care.

In order to alleviate many of these immediate complications, the care provided by the kangaroo mother method is of great help in our context.[14] We found that the early start of this care, on average before 12 days of life, improved the survival of extremely premature babies, as also reported by Wandji et al.[15] Despite being in kangaroo care, the average length of hospitalisation seemed long, as shown by the work of Chioukh and Tagare, who found averages of 50 and 56 days.[6,16] This was justified by the fact that we waited for autonomy in sucking and swallowing before authorising discharge, corresponding to a corrected gestational age of 34 weeks gestation, i.e. approximately 6 to 8 weeks of hospitalisation.

Limitations

In addition to the retrospective nature of the study, we report only short-term morbidity, and therefore lack long-term outcome. Nevertheless, our sample was large enough to give acceptable results. In a developing country where the cost of neonatal care is still prohibitive, reasonable survival rates can be achieved in neonates weighing more than 750 grams or over 25 SA at birth without the use of surfactant.

Conclusion

In urban Cameroon, the survival rate for extremely premature babies was 32.5%, with viability starting after 25 weeks amenorrhoea. The factors influencing this survival rate were: the mother's marital status and level of education, a gestational age greater than 25 weeks amenorrhoea, intra-mural birth, the time taken for immediate care (less than one hour) and the early start of mother and kangaroo care before 12 days of life.

Compliance with Ethical Standards

Funding None

Conflict of Interest None

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