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# Neonatal Emergencies in Full-term Infants: A Seasonal Description in a Paediatric Referral Hospital of Yaoundé, Cameroon

Georges Pius Kamsu Moyo<sup>\*</sup>, Donleine Sobgumezing, Hélène Tetinou Adjifack

Faculty of Medicine and Biomedical Sciences, University of Yaoundé I, Yaoundé, Cameroon

## Email address:

kamsuzicfried@yahoo.fr (G. P. K. Moyo)

<sup>\*</sup>Corresponding author

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**Abstract:** Background: A neonatal emergency may be defined as a potentially life-threatening disorder or anomaly which occurs within the first 28 days after birth. From an epidemiological stand point, some disorders may be specific to this period and so their knowledge may improve the management and be life-saving. Objective: To determine the various neonatal emergencies. Methodology: We carried out a cross-sectional study with prospective and exhaustive recruitment of full-term neonates presenting emergencies at the Mother and Child Centre of the Chantal Biya Foundation. The study lasted for 4 months and was conducted from September to December 2018 in Yaoundé, Cameroon. Results: The survey covered 235 neonatal emergencies, 28 (11.9%) were surgical emergencies, 207 (88%) were medical emergencies and 12 (5.1%) neonates had mixed emergencies. Most cases 137 (58.2%) occurred within the first week of life, the leading causes were sepsis 147 (62.5%), birth asphyxia 25 (10.6%) and jaundice 18 (7.6%). The death rate was 3.4% (08) mainly due to congenital malformations 50% (04) while 213 (90.6%) cases recovered. Conclusion: The leading causes of neonatal emergencies found in this study were not very different from those described in the literature and so prompt diagnosis and management may further improve the outcome of neonatal emergencies, with most neonates recovering.

**Keywords:** Neonate, Emergency, Cameroon

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## 1. Introduction

The neonatal period is a vulnerable period of infancy, and so neonates are a fragile population for which caution should be taken in management [1]. In the ill neonate, an apparently mild symptom may rapidly transform into a critical condition. Symptoms may be subtle and non-specific with slight behavioural changes such as modification in feeding being indicative of illness [1]. A neonatal emergency may be considered as a potentially life-threatening disorder or anomaly which occurs during the first 28 days after birth [2]. There exist two types, as medical emergencies may be distinguished from surgical emergencies. Neonatal emergencies significantly contribute to under-5 morbidity and mortality in developing countries, mainly because of poverty and limited access to quality health care especially in

rural areas [3-5]. It may account for up to 70% of neonatal deaths registered in a service [6]. There are more than 3.8 million neonates who die during their first month of life with up to half of this occurring on the first day [7]. According to the World Health Organization, over 90% of all neonatal deaths occur in developing countries [8, 9]. Apart from poverty and low quality of health care, other factors such as late postnatal visits and poor health seeking behaviour have equally been incriminated [3]. Therefore, neonatal emergency-related poor outcomes may be reduced by the implementation of optimal antenatal care, essential newborn care and the availability of skilled birth attendants [6, 10, 11]. Despite the efforts put in place in most African countries [12-14], a lot is left to be done as there persists a gap in the care for mothers and babies in the early neonatal period [15]. More over, even though interventions to provide coordinated

program with early discharge have been shown to reduce emergency department use, early and sometimes careless discharge from newborn nurseries may be responsible for further increased emergencies in neonates [1, 16, 17]. Due to the fact that neonatal emergencies may lead to fatal complications in case of inappropriate intervention, newborns brought to the emergency department might be hospitalised or kept for keen monitoring regardless of normal laboratory findings [1, 6]. Correct history taking, proper examination and intimate epidemiological knowledge of the spectrum of pathologies pertaining to this age group are necessary for accurate diagnosis and prompt management [1]. This study aimed at describing the various neonatal emergencies registered in a pediatric referral hospital of Yaoundé, Cameroon over a period of four months.

## 2. Methodology

We conducted a cross-sectional descriptive study at the Mother and Child Centre of the Chantal BIYA foundation, which is the principal pediatric referral hospital of the country. The hospital is situated in Yaoundé, the capital of Cameroon and as well the main town of the Centre region. It is a cosmopolite city and one of the two most densely populated towns of the country, with an average population close to 4.100.000 inhabitants. The hospital has most pediatric specialists and is optimally equipped for the management of sick neonates and children at large.

The study lasted for a period of four months, from September to December 2018. Ethical clearance was requested and obtained from the research and ethical committee. The recruitment of neonates brought to the emergency unit was prospective and exhaustive over the period of study. Premature neonates were excluded from the study. Potential life-threatening disorders or anomalies occurring during the first 28 days after birth were considered as neonatal emergencies.

There exist a symptomatic or systemic classification of neonatal emergencies which may contrast with the syndromic or diagnostic classification. The advantage of the later classification is the immediate possibility to initiate a holistic management. We used a combination of both classifications known as "THE MISFITS" approach of neonatal emergency which features Trauma, Heart disease (Hypoxia/Hypovolemia), Endocrine, Metabolic, Inborn errors of metabolism, Sepsis, Formula mishaps, Intestinal catastrophes, Toxins/poisons, and Seizures. The diagnosis of birth asphyxia and hypoxic ischemic encephalopathy was based on Apgar score and Sarnat's criteria, whereas jaundice was based on the presence of hyperbilirubinemia. Sepsis was characterized by the presence of risk factors; a symptomatic infant with abnormal C-Reactive Proteins (CRP) and Complete Blood Count (CBC) or positive blood culture. Silverman's classification was used for respiratory distress. Ultrasound, CT-scan and radiologic imaging were done when indicated, especially in case of malformations and other surgical emergencies. Clinical records and laboratory reports

of the participants were equally reviewed to document their definitive diagnoses.

## 3. Results

The survey covered 235 neonatal emergencies. There were 147 males and 88 females and a sex ratio of 1.7:1. Out of the 235 neonatal emergencies, 28 (11.9%) were surgical emergencies and 207 (88%) were medical emergencies. Twelve neonates (5.1%) had mixed emergencies. In average, infants with surgical emergencies were brought after 4.2 days with an outcome after management being favorable in 23 (82.1%) cases. The various surgical emergencies and their frequencies are shown on table 1 below.

*Table 1. Surgical emergencies.*

Variable	Frequency (n = 28)	Percentage (%)
Spina bifida	07	25.0
Polymalformation syndrome	06	21.4
Ano-rectal malformation	05	17.8
Intestinal occlusion	05	17.8
Omphalocele	05	17.8

Most patients 137 (58.2%) were brought to consultation within the first week of life. The average stay in hospital was 8.5 days before neonates got well. We registered a death rate of 3.4% (8 cases) with such babies having spent 6.5 days of non-effective treatment. Fourteen neonates (5.9%) were taken away by their families against medical advice while 213 (90.6%) were normally followed-up and discharged after recovery. Table 2 shows the various medical emergencies encountered.

*Table 2. Medical emergencies.*

Variable	Frequency (n = 207)	Percentage (%)
Sepsis	147	71.0
Birth asphyxia	25	12.0
Jaundice	18	8.7
Metabolic disorder	09	4.3
ALTE	05	2.9
Birth injury	02	0.9
CAH	01	0.5

\*ALTE: Apparent Life Threatening Event.

\*CAH: Congenital Adrenal Hyperplasia.

Out of 147 neonates with sepsis, 57 (38.7%) were of early onset, no focus was found in 88 cases (59.8%), while the pulmonary focus was the most frequent in over 35 cases (59.3%). The most occurring metabolic disorder was hypoglycemia in 06 cases (66.6%), followed by hypocalcaemia in 02 neonates (22.2%). Table 3 shows the case fatality rates with sepsis being the leading cause of deaths taken individually 37.5% (3) and congenital malformations predominating on a cumulative basis 50% (4).

*Table 3. Case fatality rates.*

Variable	Frequency (n = 8)	Percentage (%)
Sepsis	03	37.5
Polymalformation	02	25.0

Variable	Frequency (n = 8)	Percentage (%)
Omphalocele	01	12.5
Ano-rectal malformation	01	12.5
Intestinal occlusion	01	12.5

## 4. Discussion

In this survey, neonatal medical emergencies were predominant over surgical emergencies whereas a highest death rate was registered among neonates presenting surgical emergencies. In effect, contrarily to other studies of neonatal emergencies, a particularity of our study is to have analysed simultaneously medical and surgical emergencies [3, 6, 18, 19]. This was possible because of the availability of a surgical department in our study site, whereas other researchers could either deal with medical or surgical emergencies and not both [3, 18]. Like wise the lower death rate (3.4%) registered may equally be due to the fact that we conducted our study in one of the best pediatric referral centers of the country with higher standards in terms of human resources and medical equipment. Other studies registered higher death rates, but in settings with lower standards and with relatively larger samples [3, 6, 18, 19]. The overall deadliest emergencies were surgical (62.5%) including malformations. This is consistent with other studies where death rates due to surgical emergencies were as high as 68% of all neonatal deaths in the setting [6, 19]. The main contributing factor to this may be “delayed consultation” with an average of 4.2 days in our series. Even though prenatal diagnosis and mothers’ education might prompt timely intervention, delays in management of sick neonates almost always lead to deleterious complications as well as poor post-operative follow-up [1, 20, 21].

The three most occurring neonatal emergencies were sepsis, birth asphyxia and jaundice. This is not very different from the World Health Organization’s estimates which presents severe infections (26%), birth asphyxia (23%) and preterm birth (28%) as the three most common causes of neonatal deaths [7]. Preterm birth could not feature among neonatal emergencies in our survey given that our study population was made of full-term infants only. Some other authors also described jaundice as being a major neonatal emergency in contexts similar to ours [6, 22, 23]. In most studies, sepsis appears as a recurrent neonatal emergency probably because of neonates’ immature immune system and their early exposition to infectious agents [1, 3, 6].

More than 50% of neonates who presented with an emergency were aged less than a week. This confirms that the first week of life is one of the most vulnerable and riskiest, as demonstrated by other studies [6]. Although most of the emergencies can occur during this period, many of them could however be prevented by improvement of pregnancy follow-up, optimal essential newborn care, anticipatory guidance through newborn check-ups and parents counseling [24].

The main cause of surgical emergencies in our survey were congenital malformations, and this is in vein with findings

from a number of researches conducted on the African continent [18, 6, 19]. In effect, preventable pathologies such as spina bifida which was predominant, points out the necessity to reinforce antenatal prophylaxis such as folic acid supplementation.

The Mother and Child Centre of the Chantal Biya Foundation is a non-lucrative referral centre with multiple subventions from philanthropic partners, and so most interventions are facilitated, assuring prompt management of ill children.

## 5. Conclusion

Neonatal emergencies in this study were predominated by medical emergencies with the leading causes of all emergencies in full-term neonates being sepsis, birth asphyxia, and jaundice. On the other hand, surgical emergencies were the deadliest with congenital malformations predominating. These results are not very different from those described in the literature and so a mastery of these pathologies may help for prevention and prompt management of cases, thereby ameliorating the outcome of neonatal emergencies in our context.

## Author Contributions

The 1<sup>st</sup> author contributed to all steps, the 2<sup>nd</sup> and 3<sup>rd</sup> authors participated in data collection and analysis.

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## Ethical Approval

The study was approved by the Institutional Ethics Committee.

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