

Factors Associated With Neonatal Mortality In The Pediatric Department Of The Regional Hospital Center Of N'zérékoré (Guinea, Conakry)

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Abstract

Introduction

Neonatal mortality is an indicator of the quality of perinatal care and reflects the conditions under which newborns are managed, particularly in developing countries. This study aimed to identify the main factors associated with neonatal mortality in the pediatric department of the N'Zérékoré Regional Hospital Center.

Materials And Methods

This was a retrospective, descriptive, and analytical study covering the period from January 1, 2020, to December 31, 2024. It included hospitalized newborns aged 0 to 28 days who died. Stillbirths and deaths occurring after 28 days were excluded. Data were collected from hospital registers, medical records, and survey forms. Statistical analysis was performed using R software, with the Chi-square test used to assess statistical associations ($p < 0.05$).

Results

A total of 111 neonatal deaths were recorded out of 426 admissions (26%). The majority of deaths occurred among males (68%) and newborns aged 1 to 7 days (75%). The mean age was 6.68 ± 13.82 days. The leading diagnoses were neonatal infection (42%) and metabolic disorders (16%). Significant associations were found between neonatal mortality and the newborn's age, mode of delivery, maternal occupation, and maternal education level.

Conclusion

These results highlight the need to improve the quality of obstetric and neonatal care by strengthening maternal health education in order to reduce neonatal mortality.

Keywords: Neonatal Mortality, Risk Factors, Pediatrics, N'zérékoré, Guinea.

Introduction

Neonatal mortality refers to the death of a newborn occurring between birth and the 28th day of life. It is a major component of infant mortality and largely reflects the conditions of pregnancy, childbirth, and immediate postnatal care [1]. It is divided into two periods: early neonatal mortality (deaths occurring during the first 7 days of life) and late neonatal mortality (deaths occurring between the 8th and 28th days of life) [1,2].

According to the World Health Organization (WHO), nearly 3.3 million newborns die each year at birth and more than 4 million die within the first 28 days after birth [1]. Sub-Saharan Africa has the highest rates, due to a combination of clinical, social, and systemic factors [3,4]. In 2017, West Africa recorded a mortality rate of 45 per 1,000 live births [5].

In Guinea, data from the Demographic and Health Surveys (DHS) reveal persistent neonatal mortality, estimated at 39 per 1,000 live births in 2018 [6]. However, local hospital data, particularly in rural areas such as N’Zérékoré, remain scarce. This study aimed to address this gap by analyzing the characteristics of newborns who died and the risk factors associated with neonatal mortality at the CHR of N’Zérékoré.

Materials And Methods

This was a retrospective, descriptive and analytical study conducted from February 1, 2025 to April 30, 2025, covering the period from January 1, 2020 to December 31, 2024. It was carried out in the pediatric department of the CHR of N’Zérékoré, a regional referral hospital in southeastern Guinea, located approximately 1,000 km from the capital, Conakry. The target population included all newborns aged 0 to 28 days who were hospitalized and subsequently died during the study period. Stillbirths and those who died after 28 days were excluded.

Data were collected from hospital registers, medical records, and survey forms. The variables studied concerned the mothers’ sociodemographic characteristics (age, educational level, occupation, marital status), newborn characteristics (age, sex, weight), and clinical and obstetric aspects (type of delivery, pathologies, and time to treatment).

Statistical analysis was performed using R software. Data were described as frequencies and percentages, and the Chi-square test was used to identify statistically significant associations (p < 0.05).

The research protocol complied with ethical principles, particularly anonymity and confidentiality of data.

Results

A total of 111 neonatal deaths out of 426 were recorded during the study period, corresponding to a frequency of 26%. The majority of deaths involved male newborns (68%) and newborns aged 1 to 7 days (75%). The mean age at death was 6.68 ± 13.82 days (Table I). The mothers’ mean age was 25.56 years, with a standard deviation of 6.80 years. Most mothers were aged 21 to 31 years (62%) and had 1 to 2 children (47%). Regarding gravidity, mothers with 1 to 2 pregnancies were the most represented (48%), and 47% had secondary education. Housewives and students were the most represented occupational groups, accounting for 37% and 21%, respectively, and most mothers were married (60%). Hypertension and diabetes were the most frequent maternal medical histories, at 43% and 36%, respectively. Most pregnancies reached 37 to 41 weeks of amenorrhea (77%). The majority of mothers had attended at least two antenatal care visits (44%) (Table II). Feeding difficulties and absence of crying were the most frequent reasons for consultation, at 31% and 17%, respectively. Respiratory distress and cardiorespiratory arrest were the main causes of death (Table III). Factors significantly associated with neonatal mortality were newborn age, type of delivery, maternal occupation, and maternal educational level (Table IV).

Table I: Distribution according to newborn characteristics

	Effective= 111	Purcentaas
Sex		
Male	75	67,6
Female	36	32,4
	Sex-ratio = 2,1	
Age (days)		
1-7	84	75,7
8-28	27	24,3
Average 6,68 ± 13,82	Extrêmes : 1 day et 28 days	
Birth weight		
≤ 1500	4	3,6
1500-2500	36	32,4
2500-3999	63	56,8
≥ 4000	8	7,2

Table II: Distribution according to maternal characteristics and medical history

	Effective= 111	Purcentaas
Age group		
13-20	17	15,3
21-31	69	62,2
32-42	25	22,5
Gravidity		
≥ 5	13	11,7
0	21	18,9
1-2	53	47,7
3-4	24	21,6
Parity		
0	22	18,8
1-2	52	46,8
3-4	25	22,5
≥5	12	10,8
Level of education		
None	24	21,6
Primary	16	14,4
Secondary	52	46,8
University	19	17,1
Occupation		
Merchand	1	1
Student	6	5,4
Official	7	6,3
Housewife	60	54,1
Hairdresser	5	4,5
Seamstress	4	3,6
School	23	20,7
Teacher	2	1,8
Nurse	3	2,7
Marital status		
Single	40	36
Divorced	4	3,6
Married	67	60,4
Medical history		
Diabetes	10	9
Hypertension	12	10,8
HIV/AIDS	4	3,6
Mental depression	1	1
Viral hepatitis	1	1
Gestational age		
< à 32 SA	5	4,5
33 à 36 SA	21	18,9
37 à 41 SA	85	76,6

Number of prenatal visits		
0	1	1
1	9	8,1
2	49	44,1
3	31	27,9
4	21	18,9

Table III: Distribution according to the clinical characteristics of the newborns

	Effective= 111	Purcentaas
Reasons for consultation		
Feeding difficulty	97	87,4
Respiratory difficulty	48	43,2
Absence of crying	44	39,6
Prematurity	30	27,0
Cyanosis	29	26,1
Fever	23	20,7
Seizures	9	8,1
Hypothermia	9	8,1
Causes of death		
Respiratory distress	68	61,3
Cardiorespiratory arrest	37	33,3
Early neonatal infection	5	4,5
Malaria	4	3,6
Hypoglycemia	4	3,6
Perinatale distress	2	1,8
Prematurity	1	1,8

Table IV: Distribution according to factors associated with neonatal mortality

Les variables	Mortality		P-value
	Yes, N = 111 ¹	No, N = 309 ¹	
Age			0,001
1-7	84 (75%)	200 (65%)	
> 7	27 (25%)	109 (35%)	
Sex			0,794
Female	35 (32%)	50 (16%)	
Male	76 (68%)	259 (84%)	-
Mother s age			0,415
< 20	86 (78%)	159 (52%)	
20 et plus	24 (22%)	150 (48%)	
King of delivery			0,001
Eutocic	69 (62%)	152 (49%)	
Dystocic	42 (38%)	157 (51%)	
Parity			0,066
0-2	74 (67%)	259 (83%)	
3-5	37 (34%)	44 (14%)	

Birth weight			0,084
< 2500g	40 (36%)	120 (39%)	
Sup à 2500g	71 (61%)	189 (61%)	
Gestuttre			0,027
0-2	74 (70%)	177 (57%)	
3-5	37 (34%)	169 (43%)	-
Level of education			0,026
Non scolarisé	24(22%)	288 (93%)	
Scolarisé	87 (78%)	21 (7%)	
Occupation	111(100%)	309 (100%)	0,020
Marital Status			0,078
Marié	67 (60%)	121 (39%)	
Non Marié	44 (40%)	188 (61%)	
Maternal history	18 (36%)	309 (100%)	0,066

Discussion

The neonatal mortality frequency observed in this study (26%) is high compared with other regions of Africa. Noria H et al. in Algeria in 2015 reported a frequency of 5.3% [7]. This high frequency reflects the persistence of unfavorable structural factors (limited access to specialized care, delays in management, and insufficient material and human resources).

The majority of patients were male, with a frequency of 68%. Danielle CK et al. in Cameroon in 2014 reported 56% male newborns [8]. The excess male mortality frequently reported in the literature could be explained by greater physiological immaturity among boys.

With a mean age of 6.68 days and a standard deviation of 13.82 days, the 1-to-7-day age group was the most represented, at 75%. Ouattara A et al. in Burkina Faso in 2024 reported a mean age of 2.5 ± 5.3 days [9]. This finding could be explained by the physiological immaturity of newborns and the high frequency of perinatal complications in resource-limited settings. This highlights the importance of close monitoring and appropriate management from the first hours of life.

Fifty-seven percent of our patients had a birth weight between 2,500 g and 3,999 g, and 32% between 1,500 g and 2,500 g. Indeed, low birth weight often reflects prematurity or impaired intrauterine growth.

The mothers' mean age was 25.56 years, with a standard deviation of 6.80 years. Most mothers were aged 21 to 31 years (62%). Kaoutar et al. in Morocco reported a predominance in the 20-to-35-year age group, accounting for 80.9% [10]. Most women of reproductive age tend to have children during young adulthood (between 20 and 35 years), which corresponds to the most fertile and biologically optimal period for reproduction.

In 47% of cases, mothers had 1 to 2 children, followed by mothers who had 3 to 4 children (23%). Regarding gravidity, mothers with 1 to 2 pregnancies were the most represented, followed by those with 3 to 4 pregnancies, at 48% and 22%, respectively. This could be explained by the fact that primiparous women may lack experience or access to care, whereas grand multiparous women may experience maternal exhaustion and obstetric complications.

Secondary education was the predominant educational level among mothers, at 47%, followed by primary education at 22%. Mothers with a low level of education have poorer access to information, antenatal care, and risk prevention. Hypertension and diabetes were the most frequent maternal medical histories, at 43% and 36%, respectively.

Most pregnancies reached 37 to 41 weeks of amenorrhea (77%). Samaila A et al. in Niger in 2024 reported 75% between 37 and 42 weeks [11]. These results indicate a gradual improvement in antenatal follow-up, favoring continuation of pregnancies to term.

Mothers had attended at least two antenatal care visits in 44% of cases. Rafamatanantsoa F et al. in Madagascar in 2024 reported four antenatal care visits in 64% of cases [12]. An insufficient number of antenatal care visits (<4) reduces the chances of early detection of risks and improving neonatal survival. Eutocic deliveries were the most frequent, at 62%, but one third of deliveries were dystocic (38%). Feeding difficulties and absence of crying were the most frequent reasons for consultation, at 31% and 17%, respectively. Respiratory distress was the leading cause of death, followed by cardiorespiratory arrest, at 56% and 30%, respectively. Kaoutar E et al. reported 59% prematurity [10].

Newborn age, type of delivery, maternal occupation, and educational level were significantly associated with mortality. Kambale et al. in Congo in 2016 reported the following factors associated with neonatal mortality: male sex [1.4 (1.1–1.9); $p=0.001$] and prematurity [4.3 (2.9–6.4); $p<0.001$]

[2]. Indeed, maternal educational level and occupation are important determinants, influencing both understanding of danger signs and healthcare-seeking behavior. Dystocic deliveries appear to be a major risk factor, highlighting shortcomings in obstetric monitoring. These results confirm the need for targeted interventions in maternal and neonatal health in rural areas with limited resources.

Conclusion

Neonatal mortality at the CHR of N'Zérékoré remains high, particularly during the first seven days of life. The main associated factors are obstetric, educational, and socioeconomic in nature.

An effective reduction strategy should include strengthening antenatal care, management of complicated deliveries, training of healthcare personnel, and education of women of reproductive age.

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