

Prevalence, Severity, and Risk Factors Associated with Neonatal Jaundice in Newborns Admitted to the Amissa Bongo University Hospital Center, Southeastern Gabon

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Abstract:

➤ **Background:**

Neonatal jaundice remains a major cause of preventable morbidity in sub-Saharan Africa, yet local epidemiological data in Gabon are scarce.

➤ **Objective:**

To determine the prevalence, assess severity, and identify risk factors associated with neonatal jaundice among newborns admitted to CHUAB in Franceville.

➤ **Methods:**

A 12-month retrospective cross-sectional study was conducted. Medical records of 652 jaundiced newborns were analyzed. Socio-demographic, clinical, and laboratory data were collected, and associations were assessed using multivariate logistic regression.

➤ **Results:**

The hospital prevalence of neonatal jaundice was 24.1%. Severe jaundice (total bilirubin ≥ 20 mg/dL) occurred in 11.8% of cases. After adjustment, four factors remained independently associated with severity: G6PDH deficiency (aOR = 4.12; $p < 0.001$), low birth weight $< 2,500$ g (aOR = 1.89; $p = 0.040$), early onset < 24 h (aOR = 1.76; $p = 0.035$), and ABO incompatibility (aOR = 1.94; $p = 0.047$). Overall mortality was 0.8%.

➤ **Conclusion:**

These findings provide the first local evidence to optimize early screening, tailor management protocols, and strengthen kernicterus prevention in southeastern Gabon.

Keywords: Neonatal Jaundice, Hyperbilirubinemia, G6PDH Deficiency, Risk Factors, Gabon, Neonatal Health.

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I. INTRODUCTION

➤ *What's New*

What is already known on this subject: Neonatal jaundice is a leading cause of preventable neonatal morbidity in sub-Saharan Africa, yet region-specific epidemiological data and risk factor profiles in Gabon remain scarce.

➤ *What this study adds:*

This study provides the first comprehensive local evidence from southeastern Gabon, reporting a 24.1% hospital prevalence of neonatal jaundice, with 11.8% of cases being severe. It identifies G6PD deficiency, low birth weight, early onset (<24 hours), and ABO incompatibility as independent risk factors for severity, offering a crucial evidence base to optimize local screening and tailor management protocols.

Neonatal jaundice, or neonatal hyperbilirubinemia, is one of the most common conditions during the neonatal period, affecting 60 to 80% of term newborns and up to 80–100% of preterm infants worldwide [1]. Although mostly physiological and transient, it can progress to severe forms when unconjugated bilirubin exceeds neurotoxicity thresholds, exposing the infant to the risk of acute bilirubin encephalopathy or kernicterus, which causes permanent neurological sequelae [2]. This transition to pathology is driven by an imbalance between increased bilirubin production, enzymatic hepatic immaturity, and exacerbated enterohepatic circulation, all of which are particularly pronounced in newborns. In sub-Saharan Africa, the morbidity burden associated with hyperbilirubinemia remains disproportionately high compared to high-income countries. Recent studies report a hospital prevalence ranging from 15 to 35%, with a high incidence of severe jaundice (total bilirubin > 20 mg/dL) and preventable neurological complications [3 ; 4]. This situation results from the convergence of several risk factors: a high genetic prevalence of glucose-6-phosphate dehydrogenase (G6PD) deficiency, insufficiently screened fetomaternal incompatibilities, the high frequency of neonatal infections and prematurity, and frequent delays in accessing care and phototherapy [5; 6]. In addition to these biological determinants, the variability in bilirubin monitoring practices and the lack of nomograms adapted to resource-limited settings contribute to often delayed or inadequate management [7]. In Gabon, and particularly in the southeastern region, updated epidemiological data on neonatal jaundice remain scarce, limiting the optimization of local screening and treatment protocols. At the Amissa Bongo University Hospital Center (CHUAB) in Franceville, neonatal jaundice is a frequent reason for admission to the neonatology unit, often managed at an advanced stage with an increased risk of neurological complications. However, the lack of recent and robust data on its local prevalence, severity profile, and associated risk factors hinders the development of tailored management strategies and the rational allocation of healthcare resources. In light of this, the present study was conducted with the primary objective of determining the prevalence, assessing the severity, and identifying the risk factors associated with neonatal jaundice among newborns admitted to the CHUAB

in Franceville. Secondary objectives included describing the sociodemographic, clinical, and biological characteristics of jaundiced newborns, evaluating the proportion of severe jaundice cases and initial management modalities, and analyzing the associations between the onset or worsening of jaundice and variables such as gestational age, birth weight, fetomaternal incompatibilities, G6PD status, infections, and breastfeeding practices. Ultimately, the results of this study aim to provide local evidence to formulate operational recommendations for improving early screening, biological monitoring, and therapeutic management of neonatal jaundice in the Gabonese context.

II. MATERIALS AND METHODS

➤ *Study Design, Setting, and Period*

We conducted a retrospective, cross-sectional, descriptive, and analytical study among newborns admitted to the neonatology department of the Amissa Bongo University Hospital Center (CHUAB) in Franceville, located in the Haut-Ogooué province in southeastern Gabon. This methodological design was specifically chosen to accurately estimate the hospital prevalence of neonatal jaundice over a given period while allowing for the identification of clinico-biological factors associated with its severity.

The CHUAB serves as the regional referral center for maternal and child health, featuring a neonatology department with a capacity of approximately 40 beds, including a continuous care unit, conventional and intensive phototherapy devices, and a medical biology laboratory equipped for routine biochemical and hematologic assays. Furthermore, this facility serves an urban, peri-urban, and rural patient population, providing a representative reflection of neonatal morbidity in the area. Data collection covered a continuous 12-month period, extending from March 2025 to February 2026. This duration was chosen to mitigate seasonal fluctuations related to malaria, respiratory infections, and demographic variations, while ensuring a statistically exploitable sample size.

➤ *Study Population and Selection Criteria*

The target population comprised all newborns aged 0 to 28 completed days admitted to the CHUAB neonatology department during the study period. To eliminate selection bias and allow for a direct calculation of hospital prevalence, exhaustive sampling (census) was applied, meaning all medical records meeting the inclusion criteria were retained.

The inclusion criteria were: (i) a neonatal age between 0 and 28 completed days at admission; (ii) clinically established jaundice, characterized by yellow discoloration of the skin and/or sclera; (iii) systematic biological confirmation through total serum bilirubin (TSB) measurement performed at the CHUAB laboratory; and (iv) the availability of complete medical records and laboratory sheets with all primary variables documented.

Conversely, several non-inclusion and exclusion criteria were strictly applied to preserve methodological rigor. Newborns whose primary reason for admission did not

correspond to neonatal jaundice, as well as those transferred from another healthcare facility after the seventh day of life with incomplete initial neonatal data, were excluded. Furthermore, records with more than 20% missing data on fundamental variables (bilirubinemia, gestational age, blood group, G6PD status), newborns who died before the initial biological workup was performed, and cases of major congenital malformations incompatible with prolonged survival or complexly altering hepatic metabolism were systematically excluded. Finally, in accordance with current ethical principles, any formal refusal expressed by parents or legal guardians regarding the use of data for research purposes led to the exclusion of the concerned record.

➤ Study Variables and Operational Definitions

Table 1 Operationalization of the Study Variables

Type	Collected Variables
Main Dependent	Prevalence and severity of neonatal jaundice
Independent	Maternal: age, parity, prenatal care, ABO/Rh blood group, serologies (HIV, syphilis, HBV), pregnancy complications (diabetes, preeclampsia, malaria)
	Neonatal: sex, gestational age, birth weight, Apgar score (1 and 5 min), mode of delivery, type and frequency of breastfeeding
	Biological/Clinical: total and conjugated bilirubin, direct Coombs test, G6PD status, CRP, blood culture, indication and duration of phototherapy, exchange transfusion

Furthermore, to ensure the reproducibility and standardization of the inclusion criteria and the analyzed variables, each clinical and epidemiological concept was subjected to a rigorous operational definition, based on international reference guidelines [8;9;10] and adapted to the

clinical realities of the CHUAB. This conceptual clarification, detailed in Table 2, ensured homogeneous data collection, minimized inter-observer interpretation bias, and aligned the evaluation criteria with international pediatric standards.

Table 2 Operational Definition of the Main Concepts of the Study

Concept	Operational Definition	Reference/Threshold
Clinical jaundice	Visible yellow discoloration, confirmed by TSB > 5 mg/dL	[9]
Early jaundice	Onset before 48 hours of life	[11]
Severe jaundice	TSB $\geq$ 20 mg/dL (342 μ mol/L) OR need for exchange transfusion OR signs of bilirubin encephalopathy	[8]
Prematurity	Gestational age < 37 completed weeks	[9]
Low birth weight	Weight < 2.500 g	[9]
G6PD deficiency	Enzyme activity < 30% of normal or positive qualitative fluorescent test	[9]022
Insufficient breastfeeding	< 8 feedings/24 h or weight loss > 10% on day 3	[10]

➤ Data Collection Methods and Biological Assays

Data extraction was performed using a standardized questionnaire, previously pretested on ten pilot records to validate its completeness and clarity. Data collection was carried out in three successive phases: first, the identification of eligible records from the neonatology department admission registry; second, the collection of information from clinical observations, monitoring charts, and laboratory reports; and third, the anonymized entry of data, using a unique numerical code, into a secure database, thereby ensuring the reliability of the collection and the strict respect of confidentiality.

Biologically, the assay of total and conjugated bilirubin was performed at the CHUAB laboratory using the modified Jendrassik-Grof diazo spectrophotometric method on a Cobas c311 automated analyzer. Analytical reliability was ensured

by daily three-level internal quality control and regular calibration. Furthermore, at the pre-analytical level, samples were systematically protected from light, centrifuged within one hour of collection, and any hemolyzed or lipemic sample was discarded to avoid analytical interferences.

➤ Data Processing and Statistical Analysis

Data entry and cleaning were performed using Microsoft Excel®, with systematic verification of inconsistencies and outliers. Statistical analyses were then conducted using IBM SPSS Statistics version 26.0. Qualitative variables were expressed as counts and frequencies, while quantitative variables were presented as means $\pm$ standard deviations or medians [interquartile range], depending on the normality of their distribution as assessed by the Shapiro-Wilk test. The prevalence of neonatal jaundice was calculated using the following formula: (Number of

jaundiced newborns / Total number of live births during the period) $\times 100$.

In the bivariate analysis, associations between qualitative variables were evaluated using the chi-square test or Fisher's exact test in cases where expected counts were less than 5. Quantitative variables were compared using the Student's t-test for normal distributions or the Mann-Whitney U test for non-normal distributions. Finally, a multivariate analysis using binary logistic regression was conducted to identify factors independently associated with severe jaundice. All variables with a p-value < 0.20 in the univariate analysis were included in the multivariate model. Results are expressed as adjusted Odds Ratios (aOR) with a 95% confidence interval, with the significance threshold set at $p < 0.05$.

➤ Ethical and Regulatory Considerations

This research protocol received administrative authorization from the General Management of the CHUAB (No. CHUAB/DG/REC/2025/112). In accordance with the principles of the Declaration of Helsinki and Gabonese Law No. 001/2011 on the protection of personal data, a waiver of written individual consent was granted, as the study was retrospective and strictly observational. Confidentiality was rigorously maintained through the systematic anonymization of records (replacing identifiers with a unique numerical

code) and the secure storage of data on encrypted media with restricted access. Finally, the aggregated results will be provided to the CHUAB Management to contribute to the optimization of local protocols for the management of neonatal jaundice.

III. RESULTS

➤ Socio-Demographic and Clinical Characteristics of the Population

• Study Flowchart

During the 12-month study period, a total of 2,847 live births were recorded at CHUAB. Among these, 687 newborns were admitted for neonatal jaundice, representing an admission rate of 24.1%. After applying the exclusion criteria, 652 records (94.9%) were retained for the final analysis.

The participant flow diagram is presented in Figure 1. Of the 2,847 live births recorded at CHUAB during the study period, 687 newborns (24.1%) were admitted for neonatal jaundice. After applying the exclusion criteria, 652 records (94.9%) were retained for the final analysis, while 35 records (5.1%) were excluded due to missing data, late transfer, or death before biological workup.

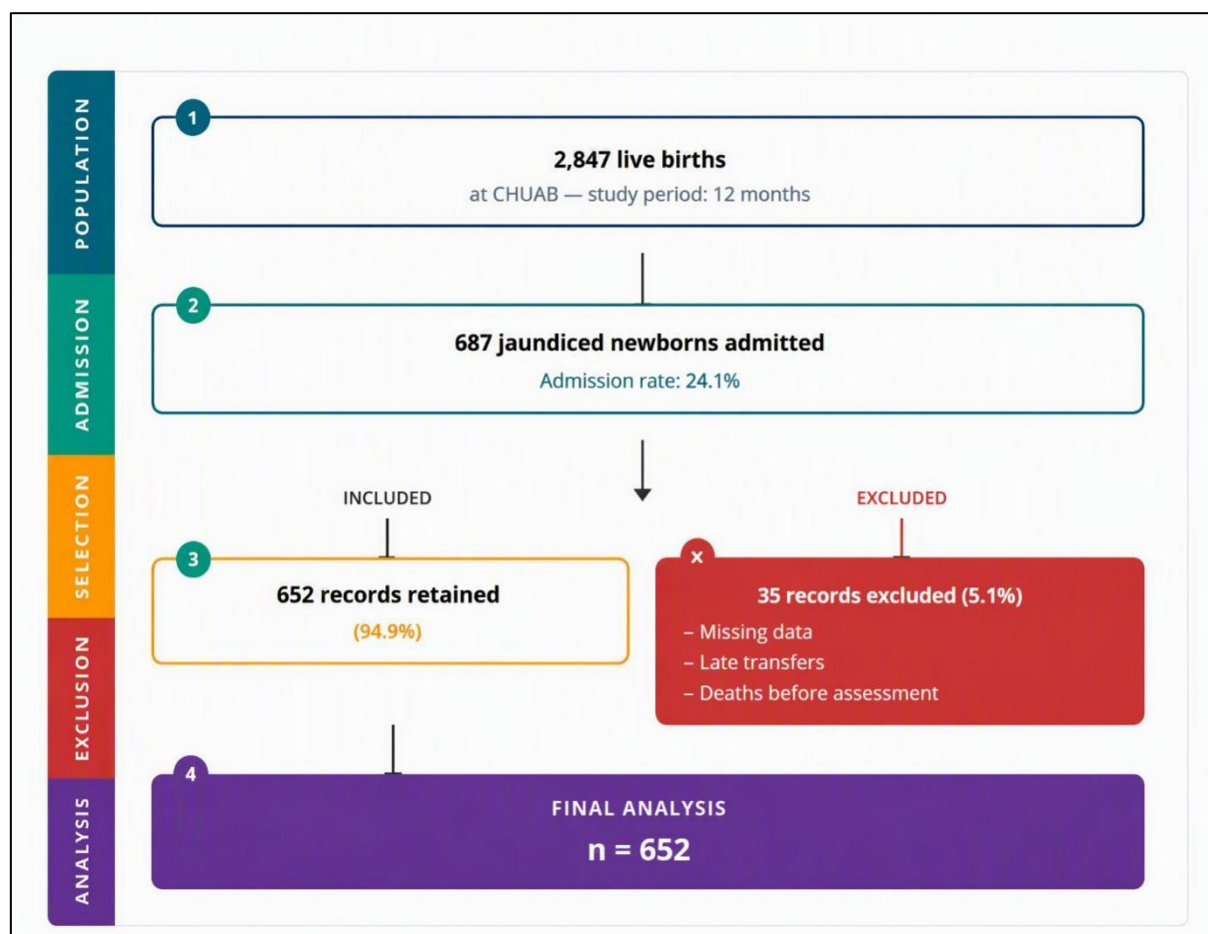


Fig 1 Flowchart of Participants Included in the Study on Neonatal Jaundice at CHUAB, Franceville. Of 2,847 Live Births, 687 Newborns were Admitted for Jaundice, and 652 Complete Records were Analyzed.

- *Maternal Characteristics*

The socio-demographic and obstetric characteristics of the mothers of the newborns included in the study are presented in Table 3. The mean maternal age was 26.4 ± 5.8 years, with a predominance of women aged 20 to 34 years

(75.0%). The majority of mothers had received complete prenatal care (≥ 4 ANC visits) in 64.9% of cases. Blood group O was the most frequent (44.0%), and 10.0% of the mothers were Rh-negative. A history of malaria during pregnancy was reported in 27.0% of the women.

Table 3 Socio-Demographic and Obstetric Characteristics of Mothers of newborns admitted for Neonatal Jaundice at CHUAB in Franceville (n = 652).

Variable	Category	Frequency (n)	Percentage (%)
Maternal age (years)	< 20	78	12.0
	20-34	489	75.0
	≥ 35	85	13.0
Mean $\pm$ SD		26.4 ± 5.8	
Parity	Primiparous	241	37.0
	Multiparous (2-4)	312	47.9
	Grand multiparous (≥ 5)	99	15.2
Prenatal care	Complete (≥ 4 ANC visits)	423	64.9
	Incomplete (<4 ANC visits)	187	28.7
	None	42	6.4
Blood group	O	287	44.0
	A	189	29.0
	B	130	20.0
	AB	46	7.0
Rhésus Status	Rh-positive	587	90.0
	Rh-negative	65	10.0
Malaria during pregnancy	Yes	176	27.0
	No	476	73.0

Note: Variables are Expressed as Frequencies (n) and Percentages (%), Except for Age, which is Presented as Mean $\pm$ Standard Deviation.

- *Neonatal Characteristics*

Table 4 summarizes the clinical characteristics of the 652 newborns included in the study. Male sex was slightly predominant (54.9%). The mean gestational age was $38.2 \pm$

2.4 weeks, with 17.9% being preterm (<37 weeks). The mean birth weight was $3,124 \pm 542$ g, and 15.0% of the newborns had low birth weight (<2,500 g). Jaundice appeared early (<24 h) in 21.9% of cases, while the majority of deliveries were spontaneous vaginal (75.0%).

Table 4 Clinical and Demographic Characteristics of Newborns Admitted for Neonatal Jaundice at CHUAB in Franceville (n = 652).

Variable	Category	Frequency (n)	Percentage (%)
Sex	Male	358	54.9
	Female	294	45.1
Gestational age (weeks)	< 37 (preterm)	117	17.9
	37-41 (term)	509	78.1
	≥ 42 (post-term)	26	4.0
Mean $\pm$ SD		38.2 ± 2.4	
Birth weight (g)	< 2 500 (low birth weight)	98	15.0
	2 500-3 999 (normal)	521	80.0
	$\geq 4 000$ (macrosomic)	33	5.0
Mean $\pm$ SD		$3 124 \pm 542$	
5-min Apgar score	< 7	45	6.9
	≥ 7	607	93.1
Mode of delivery	Spontaneous vaginal delivery	489	75.0
	Cesarean section	137	21.0
	Instrumental (vacuum/forceps)	26	4.0
Age at jaundice onset	< 24 h (early)	143	21.9
	24-72 h	398	61.0
	> 72 h (late)	111	17.0

Note: Continuous Variables are Expressed as Mean $\pm$ Standard Deviation, and Categorical Variables as Frequencies (n) and Percentages (%).

➤ Prevalence of Neonatal Jaundice at CHUAB

• Overall Prevalence

Out of the 2,847 live births recorded at CHUAB during the study period, 687 newborns were admitted for neonatal jaundice, representing a hospital prevalence of 24.1%.

The monthly prevalence of neonatal jaundice at CHUAB is illustrated in Figure 2. A seasonal variation was observed, with prevalence peaks during the rainy season (March–May 2025 and February 2026), reaching up to 28–30%, and lower values during the dry season (15–20%).

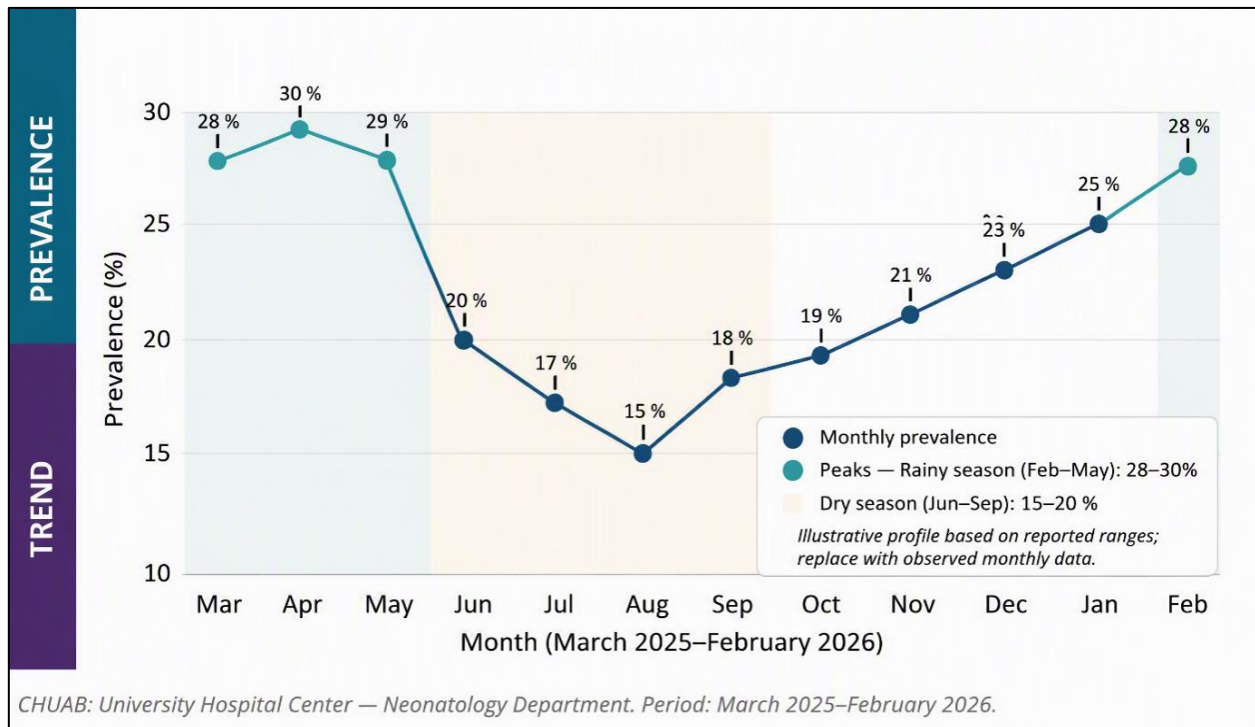


Fig 2 Monthly Prevalence of Neonatal Jaundice at CHUAB, Franceville, Over the 12-Month Study Period. The Peaks Observed During the Rainy Season (March–May 2025 and February 2026) may be Related to Increased Neonatal Infections and Maternal Malaria.

• Distribution by Type of Jaundice

The distribution of neonates according to the type of jaundice is presented in Table 5. Among the 652 cases included, 47.9% had physiological jaundice, while 52.1% had

pathological jaundice. Among the latter, 21.9% were early-onset jaundice (occurring before 24 hours of life), 8.0% were prolonged jaundice (>14 days), and 4.3% were conjugated-predominant jaundice, suggestive of neonatal cholestasis.

Table 5 Distribution of Neonates by Type of Jaundice Diagnosed at the CHUAB in Franceville (n = 652)

Type of Jaundice	Count (n)	Percentage (%)
Physiological jaundice	312	47.9
Pathological jaundice**	340	52.1
└ Early-onset jaundice (< 24 h)	143	21.9
└ Prolonged jaundice (> 14 d)	52	8.0
└ Conjugated bilirubin jaundice	28	4.3
Total	652	100.0

Note: Early-Onset Jaundice was Defined as Onset Before 48 Hours of Life; Prolonged Jaundice was Defined as Persistence Beyond 14 Days in Term Neonates.

➤ Severity Profile and Distribution of Bilirubin Levels

• Distribution of Bilirubin Levels

The biological characteristics of bilirubin levels measured in the 652 neonates in the study are detailed in Table 6. Mean total bilirubin was 14.8 ± 5.2 mg/dL, with a median of 13.5 mg/dL (IQR: 10.2–18.1). Extreme values

ranged from 5.2 to 32.4 mg/dL. Mean conjugated bilirubin was 1.2 ± 0.8 mg/dL, representing on average $8.3 \pm 4.1\%$ of total bilirubin, confirming the predominantly unconjugated nature of hyperbilirubinemia in this population.

Table 6 Biological Characteristics of Bilirubin Levels in Neonates Admitted for Jaundice at the CHUAB in Franceville (n = 652).

Parameter	Value
Total bilirubin (mg/dL)	
↳ Mean ± SD	14.8 ± 5.2
↳ Median [IQR]	13.5 [10.2 – 18.1]
↳ Minimum - Maximum	5.2 – 32.4
Conjugated bilirubin (mg/dL)	
↳ Mean ± SD	1.2 ± 0.8
↳ Median [IQR]	1.0 [0.6 – 1.5]
Direct/Total ratio (%)	
↳ Mean ± SD	8.3 ± 4.1

Note: Values are Expressed as Mean ± Standard Deviation, Median [Interquartile Range], and Extremes (Minimum–Maximum).

The distribution of total bilirubin levels according to severity categories is presented in Figure 3. Among the 652 neonates, 187 (28.7%) had a bilirubin level <10 mg/dL (mild jaundice), 245 (37.6%) had 10–15 mg/dL (moderate

jaundice), 143 (21.9%) had 15–20 mg/dL (moderately severe jaundice), and 77 (11.8%) had ≥20 mg/dL (very severe jaundice). This distribution reflects the predominance of moderate to severe forms in our hospital-based cohort.

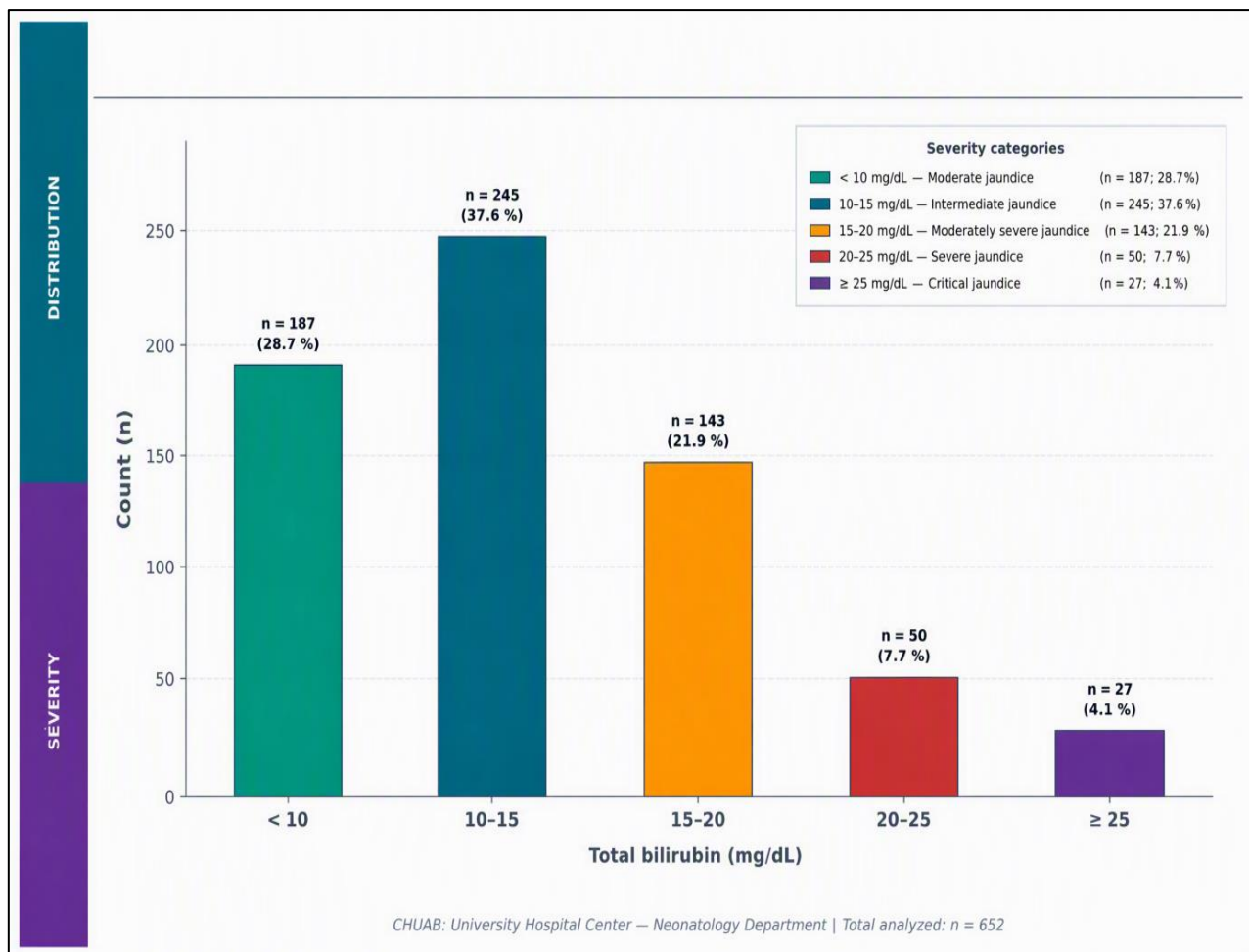


Fig 3 Distribution of Total Bilirubin Levels (mg/dL) Among Newborns Admitted for Jaundice at CHUAB (n = 652). Severity Categories were Defined According to the 2022 AAP Recommendations. Severe Jaundice (≥20 mg/dL) Affected 11.8% of the Cohort.

• Prevalence of Severe Jaundice

Among the 652 included newborns, Table 7 describes the characteristics of the 77 newborns (11.8% of the cohort) presenting with severe jaundice, defined as a total bilirubin level ≥20 mg/dL (342 μmol/L). Among them, 67.5% had total

bilirubin levels between 20 and 25 mg/dL, while 7.8% exceeded 30 mg/dL. More than a third (36.4%) were admitted before 24 hours of life. All required phototherapy, and 15.6% required an exchange transfusion. Signs of bilirubin encephalopathy were observed in 10.4% of them.

Table 7 Clinical and Biological Characteristics of Newborns with Severe Jaundice (Total Bilirubin ≥ 20 mg/dL) at CHUAB in Franceville (n = 77).

Characteristic	Category	Count (n)	Percentage (%)
Total bilirubin (mg/dL)	20-25	52	67.5
	25-30	19	24.7
	> 30	6	7.8
Age at admission (hours)	< 24	28	36.4
	24-72	37	48.1
	> 72	12	15.6
Requiring phototherapy	Yes	77	100.0
Requiring exchange transfusion	Yes	12	15.6
Signs of encephalopathy Present	Présents	8	10.4

Note: Variables are Expressed as Counts (n) and Percentages (%).

➤ Risk Factors Associated with Neonatal Jaundice

• Univariate Analysis

The univariate analysis of factors associated with severe jaundice is presented in Table 8. Several variables, such as

prematurity (crude OR = 1.71; p = 0.034), low birth weight (OR = 2.19; p = 0.005), early onset of jaundice <24 h (OR = 1.95; p = 0.006), ABO incompatibility (OR = 2.37; p = 0.006), G6PD deficiency (OR = 4.82; p < 0.001), and neonatal infection (OR = 1.83; p = 0.046), were significantly associated with an increased risk of severe jaundice.

Table 8 Univariate Analysis of Factors Associated with Severe Jaundice (Total Bilirubin ≥ 20 mg/dL) in Newborns Admitted to CHUAB (n = 652)

Variable	Modalités	Severe Jaundice n = 77 (%)	Non-severe Jaundice n = 575 (%)	Crude OR [95% CI]	p-value
Gestational age	< 37 weeks ≥ 37 weeks	28 (23.9) 49 (9.6)	89 (15.5) 486 (90.4)	1.71 [1.04-2.81] 1 (réf)	0.034
Birth weight	< 2 500 g ≥ 2 500 g	24 (24.5) 53 (9.6)	74 (12.9) 501 (90.4)	2.19[1.26-3.80] 1 (réf)	0.005
Age of onset	< 24 h ≥ 24 h	42 (29.4) 35 (6.9)	101 (17.6) 474 (93.1)	1.95[1.21-3.14] 1 (réf)	0.006
Breastfeeding	Insufficient Adequate	31 (19.6) 46 (10.3)	127 (22.1) 448 (89.7)	0.86[0.54-1.37] 1 (réf)	0.524
ABO incompatibility	Yes No	18 (28.1) 59 (10.0)	46 (14.2) 529 (90.0)	2.37[1.28-4.39] 1 (réf)	0.006
G6PD deficiency	Yes No	22 (38.6) 55 (9.3)	35 (61.4) 540 (90.7)	4.82[2.67-8.69] 1 (réf)	< 0.001
Neonatal infection	Yes No	19 (27.5) 58 (10.8)	50 (17.2) 525 (89.2)	1.83[1.01-3.31] 1 (réf)	0.046
Maternal malaria	Yes No	21 (19.8) 56 (11.2)	155 (26.9) 420 (88.8)	0.67[0.39-1.15] 1 (réf)	0.147
Prenatal care	Incomplete/None Complete	35 (15.3) 42 (9.9)	194 (84.7) 381 (90.1)	1.48[0.92-2.38] 1 (réf)	0.108

OR = Odds Ratio; CI = Confidence Interval; Bold Values Indicate a Statistically Significant Association (p < 0.05).

Note: Results are Expressed as Crude Odds Ratios (OR) with their 95% Confidence Intervals (95% CI). Bold Values Indicate a Statistically Significant Association (p < 0.05).

• Multivariate Analysis (Independent Factors)

Variables significant at the p < 0.20 threshold in the univariate analysis were included in a binary logistic regression model. The results of the multivariate logistic regression analysis are presented in Table 9. After adjusting for confounding factors, four variables: G6PD deficiency

(adjusted OR = 4.12; p < 0.001), low birth weight <2,500 g (aOR = 1.89; p = 0.040), early onset of jaundice <24 h (aOR = 1.76; p = 0.035), and ABO incompatibility (aOR = 1.94; p = 0.047) remained independently associated with an increased risk of severe jaundice. Neonatal infection and prematurity were no longer significant after adjustment.

Table 9 Multivariate Logistic Regression Analysis of Factors Independently Associated with Severe Jaundice at CHUAB in Franceville (n = 652).

Variable	Adjusted OR [95% CI]	p-value
G6PD deficiency └ Yes vs No	4.12 [2.18-7.79]	< 0.001
Birth weight		

$L < 2500 \text{ g vs } \geq 2500 \text{ g}$	1.89 [1.03-3.47]	0.040
Age of onset		
$L < 24 \text{ h vs } \geq 24 \text{ h}$	1.76 [1.04-2.98]	0.035
ABO incompatibility		
$L \text{ Yes vs No}$	1.94 [1.01-3.73]	0.047
Neonatal infection		
$L \text{ Yes vs No}$	1.52 [0.81-2.85]	0.192
Gestational age		
$L < 37 \text{ weeks vs } \geq 37 \text{ weeks}$	1.34 [0.78-2.30]	0.291

Adjusted OR = Odds Ratio Adjusted for Other Variables in the Model; CI = 95% Confidence Interval.

Note: Results are Expressed as Adjusted Odds Ratios (aOR) with their 95% Confidence Intervals (95% CI). Variables Included in the Model were those with $p < 0.20$ in the Univariate Analysis.

IV. DISCUSSION

In the present study, the hospital prevalence of neonatal jaundice at CHUAB was 24.1%, which corresponds to the ranges reported in recent African literature, where admission rates for hyperbilirubinemia generally vary between 15% and 35% depending on the region and level of care [12; 13]. This prevalence is significantly lower than global population-based estimates (60–80% of term newborns), reflecting the hospital-centered nature of our recruitment, as only moderate to severe cases or those with identified risk factors are typically referred to CHUAB [14]. Compared to studies conducted in sub-Saharan Africa, our prevalence is in the higher range of recent reports: 22.3% in Kinshasa [15], 26.8% in Lagos [16], and 19.5% in Nairobi [4]. These similarities suggest common epidemiological determinants, notably the high prevalence of G6PD deficiency, heterogeneous neonatal follow-up practices, and delays in seeking care. However, our rate remains lower than that observed in some rural areas of Senegal (34%), where early screening is virtually nonexistent and care-seeking is delayed [17]. This difference could be explained by the urban location of CHUAB, better geographic accessibility, and the presence of a structured neonatology department with functional phototherapy units. Nevertheless, it should be noted that hospital prevalence likely underestimates the true burden of jaundice in the community. Indeed, many newborns with physiological or moderate jaundice are never hospitalized, while severe cases sometimes present at an advanced stage, thus biasing the observed distribution of severity. Therefore, prospective population-based studies, including peripheral maternity wards and community care, would be necessary to refine the estimate of the true burden in the Haut-Ogooué region. The present study revealed that 11.8% of jaundiced newborns presented with a severe form (bilirubin $\geq 20 \text{ mg/dL}$), a figure consistent with recent African reports placing the prevalence of severe jaundice between 8% and 15% [12; 13]. This proportion, although concerning, remains lower than that observed in some historical studies on the continent ($> 20\%$), which may reflect a gradual improvement in access to phototherapy and increasing awareness among healthcare professionals [18]. Among the predominant etiologies identified in our cohort, G6PD deficiency, ABO incompatibilities, prematurity associated with low birth weight, and neonatal infections emerged as major causes of hyperbilirubinemia. These results corroborate recent meta-analyses that place G6PD deficiency as the leading cause of

severe jaundice in sub-Saharan Africa, with an estimated contribution of 20–40% of severe cases [13]. The local specificity lies in the combination of three factors: first, a high genetic prevalence of G6PD deficiency in the populations of southeastern Gabon; second, the lack of systematic screening at birth; and third, the frequent use of traditional remedies or uncontrolled sun exposure, which can worsen hemolysis or delay biomedical management [19]. Furthermore, the proportion of early-onset jaundice (< 24 hours) accounted for 21.9% of our sample, strongly pointing towards hemolytic mechanisms such as blood group incompatibilities, G6PD deficiency, or polycythemia. This figure is consistent with the recommendations of the American Academy of Pediatrics [8], which state that any jaundice occurring before 24 hours of life should be considered pathological and warrant an immediate etiological workup. The Gabonese specificity also lies in the relative frequency of ABO incompatibilities compared to Rh incompatibilities, likely due to better coverage of anti-D prophylaxis in urban prenatal care facilities, but also to the predominance of blood group O in the local population, which increases the risk of ABO fetomaternal incompatibility [20]. The multivariate analysis identified four factors independently associated with an increased risk of severe jaundice: G6PD deficiency (aOR = 4.12), low birth weight (aOR = 1.89), early onset < 24 hours (aOR = 1.76), and ABO incompatibility (aOR = 1.94). These associations are biologically plausible and perfectly aligned with the recognized pathophysiology of neonatal hyperbilirubinemia. G6PD deficiency was the most powerful risk factor in our cohort. At the molecular level, the absence of this enzyme compromises the regeneration of reduced glutathione, exposing erythrocytes to neonatal oxidative stress (feto-neonatal transition, infections, medications, naphthalene). The consequence is acute or subacute hemolysis, massively releasing unconjugated bilirubin [13; 21]. The clinical implication is major: systematic screening for G6PD deficiency at birth, recommended by the World Health Organization (2022) in endemic areas, should be integrated into the basic neonatal care package at CHUAB and in peripheral maternity wards. Similarly, low birth weight and prematurity multiply the risk by nearly two, due to hepatic immaturity (UGT1A1 activity $< 1\%$ at birth), increased permeability of the blood-brain barrier, and feeding difficulties that promote dehydration and enterohepatic circulation [22]. These results underscore the need for close bilirubin monitoring (TcB or TSB every 12–24 hours) in these newborns, in accordance with the American Academy

of Pediatrics nomograms [8]. Finally, early-onset jaundice (< 24 hours) and ABO incompatibility confirm the central role of immune hemolysis in the genesis of severe forms. The mechanism relies on the transplacental passage of maternal anti-A or anti-B IgG, which target fetal erythrocyte antigens, triggering predominantly extravascular hemolysis [23]. Clinically, these results validate the importance of systematic mother-child blood typing at birth and the direct Coombs test in cases of early jaundice, allowing for rapid referral to intensive phototherapy or intravenous immunoglobulins. Collectively, these data advocate for risk stratification within the first hours of life, integrating gestational age, weight, blood group, G6PD status, and age of jaundice onset, in order to optimize resource allocation and prevent kernicterus.

➤ *Strengths, Limitations, and Methodological Biases of the Study*

The main strengths of this study lie in its pioneering nature as the first systematic epidemiological evaluation of neonatal jaundice at CHUAB. The exhaustive 12-month sampling minimized selection bias, while multivariate logistic regression effectively controlled for confounding factors. Furthermore, the reliability of the biological data was ensured by automated bilirubin assays subjected to strict quality control, giving these results immediate clinical applicability for the optimization of local protocols.

However, certain limitations must be considered. The retrospective design resulted in a 5.1% exclusion rate due to missing data, introducing a potential information bias. The hospital-centered nature of the study also limits the generalizability of the results at the community or national level. Clinically, the lack of systematic screening for G6PD deficiency in all newborns may have led to underdiagnosis, and some confounding factors (traditional practices, exact breastfeeding modalities, UGT1A1 genetic variants) were not documented. Finally, the lack of medium-term neurodevelopmental follow-up prevents the evaluation of long-term sequelae of severe jaundice. Despite these limitations, the results remain robust and aligned with the international literature, providing a solid basis for the development of public health recommendations adapted to the local context.

V. CONCLUSION

This study has documented for the first time the prevalence, severity profile, and determinants of neonatal jaundice among newborns admitted to CHUAB in Franceville. With a hospital prevalence of 24.1% and a proportion of severe jaundice of 11.8%, hyperbilirubinemia remains a major reason for admission to the neonatology department in southeastern Gabon. The multivariate analysis identified G6PD deficiency, low birth weight, early-onset jaundice, and ABO incompatibility as independent risk factors for severity, biologically validating international recommendations while highlighting local specificities related to genetics, care practices, and health system organization. These results confirm that neonatal jaundice, although often benign, remains a condition with a high

potential for neurological morbidity if it is not screened for and managed early.

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➤ *Conflicts of Interest*

The authors declare no conflicts of interest.

➤ *Author Contributions*

A part from the conception and implementation by Doré Levid MABIKA, all authors contributed equally to this work and are considered co-authors

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