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Epidemiological and Clinical Characteristics of Low Birth Weight in the Pediatric Department of the Reference Health Center of Commune I of Bamako in 2020

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Abstract	Original Research Article

Introduction: Birth weight is one of the essential indicators for assessing the state of health of the newborn. It provides information on the chance of surviving during the neonatal period, on the potential for growth and development from birth. Low birth weight or low birth weight is defined as a birth weight less than 2500g regardless of gestational age. ***Method and Materials***: this is a retrospective and descriptive study of newborns admitted to the neonatology unit of the pediatrics department at the Reference Health Center of Commune I of Bamako from January to December 2020. ***Results***: During the study period, 1702 newborns were received at the neonatology unit, of which 247 had a birth weight of less than 2500g, i.e. a frequency of 14.5%. The majority of mothers, 69.6%, were aged 18 to 35 with an average age of 24.5 years. They were unschooled (49.8%), housewives (79.4). Mothers had completed at least four prenatal consultations in 31.6% of cases compared to zero consultations (8.1%). The first obstetric ultrasound was performed after 14 weeks of amenorrhea in 58.7%. The gestational age most represented by low birth weights was 32 to 36 weeks+6 days in 64.8% of cases. The sex ratio was 1.2 in favor of boys. The mother and low weight couples resided in commune I in 60% of cases. Low birth weight was due to prematurity in 81.4% compared to 19.6% due to intrauterine growth restriction. Low birth weights were presented with hypothermia in 56.3%. The average body temperature was 35.6% with extremes of 33°C to 38.9°C. mortality was 9.3%. Neonatal infection was the cause of death in 56.6%. ***Conclusion***: The neonatal period is particularly critical for low birth weights. Taking measures against this phenomenon is essential to reduce neonatal mortality.
Keywords: neonatology unit, Low birth weight, Bamako, Pediatric.

INTRODUCTION

Low birth weight, also called low birth weight, is a birth weight strictly below 2500g, whatever the term of the pregnancy. It is a major public health problem, both in industrialized and developing countries [1].

According to an analysis published by researchers from the London School of Hygiene and Tropical Medicine in collaboration with UNICEF and WHO, more than 20 million babies weighing less than 2500g were born worldwide in 2019 [2]. In developed countries, the lowest rates of low birth weight were recorded by Sweden at 2.4%, New Zealand (5.7%), Australia (6.5%), the United Kingdom. United (7%), United States (8%) [2]. In Africa, the rate of low birth weight is much higher, in Algeria at the "Sidi Bel Abbes"

maternity ward they represented 7.02% of births in 2016 [3]; in Lubumbashi in the Democratic Republic of Congo 13% in 2016 [4]; in Benin 9.1% in the commune of Tori-Bossito in 2014 [5]; in Senegal 14% in Kolda in 2017 [6]; In Burkina Faso 9.6% in 2021 [7]. In Mali, low birth weights represented 15% of newborns according to the demographic and health survey (EDSM-VI) in 2018 [8]. At the neonatology of the CHU GT and the reference health center of commune VI of Bamako, low birth weights represented respectively 29.9% and 34.9% of hospitalizations [9;10] and 38.6% of death in 2020 [9]. The neonatal mortality rate for low birth weight is 51‰ compared to 22‰ live births for normal weight newborns [5]. More than 80% of the 2.5 million newborns who die each year are attributable to low birth weight, whatever the cause. Survivors of low birth weight are at risk of impaired height, weight, psychomotor and mental development [2].

Due to management difficulties, low birth weights represent a major concern in developing countries [5]. This study entitled "epidemiological and clinical characteristics of low birth weight in the pediatric department of the reference health center of commune I of Bamako" aims to identify the sociodemographic profile of mothers and to describe the clinical aspect of low birth weight received at the neonatology during the year 2020.

METHOD AND MATERIALS
The study was carried out at the neonatology unit in the pediatric department of the reference health center of commune I of Bamako. This was a retrospective and descriptive study of low birth weights admitted to the neonatology from January to December 2020. The reference health center of commune I is a second-level public establishment in the health pyramid of Mali. Its main mission is to support the implementation of the national health policy. The data was collected on information sheets established for this purpose. The hospitalization register, medical records (hospitalization and kangaroo mother care) were used. The variables studied focused on the sociodemographic data of the mothers, the gynecological history of the mothers, the follow-up of the pregnancy, the data on low birth weight. Low birth weights whose medical records were unusable (files not available or incomplete) were excluded from the study. The data were processed and analyzed using SPSS software version 18.0 then entered into Word 2016 software. All variables were analyzed and commented on.

Ethics: The agreement of the administration of the Reference Health Center of commune I was obtained before carrying out the study. Confidentiality and anonymity were ensured, no personal identifiers were collected.

RESULTS
From January to December 2020, the neonatology unit of the pediatric department of commune I admitted 1702 newborns including 247 low birth weight, a frequency of 14.5%.

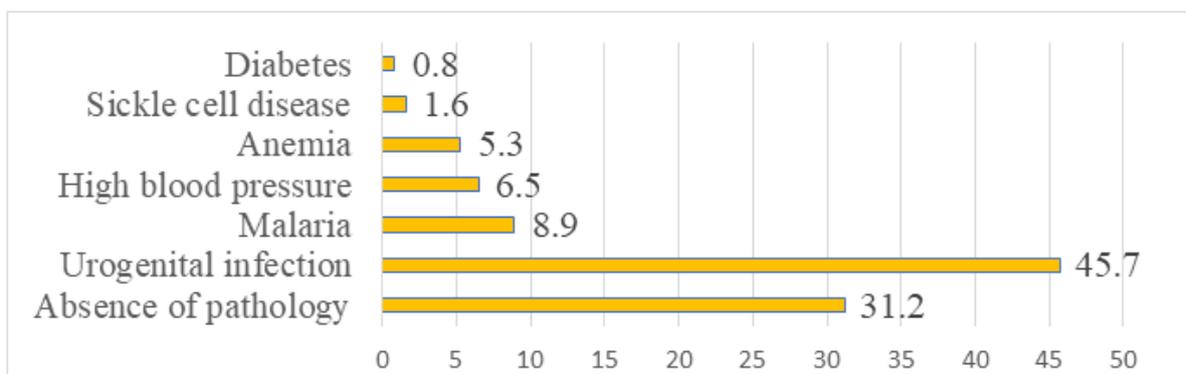**Table I: Distribution of mothers according to socio-demographic profile**

Socio-demographic profile	Number (n= 247)	Percentage
Age of mothers		
< 18 years old	49	19.8
18 to 35 years old	172	69.6
> 35 years old	26	10.5
Educational level of mothers		
Out of school	123	49.8
Primary	48	19.4
Secondary	54	21.9
Superior	22	8.9
Profession of mothers		
Household	196	79.4
Student	38	15.4
Saleswoman	7	2.8
Official	6	2.4
Residence		
Municipality 1	148	59.92
Outside municipality 1	199	40.08

Mothers aged 18 to 35 were more represented, i.e. 69.6% with an average age of 24.5 years. Municipality 1 was the most represented residence, i.e. 59.92%.

Table II: Distribution of mothers according to obstetric history

Obstetric history	Number (n= 247)	Percentage
Gesture		
Primigest	94	38.1
Paucigest	73	29.6
Multigesture	52	21.0
Large-multigesture	28	11.3
Parity		
Primiparous	105	42.5
Pauciparous	73	29.6
Multiparous	48	19.4
Large multiparous	21	8.5

Primigests and primiparas represented 38.1% and 42.5% of mothers.

Graph 1: Distribution of mothers according to pathology associated with pregnancy

Pregnancies associated with pathologies were more represented at 68.8%.

Table III: Distribution of mothers according to pregnancy monitoring activities

| Pregnancy monitoring	Number (n=247)	Percentage
Qualification of the agent responsible for monitoring		
Midwife	180	72.9
Gynecologist	31	12.6
General doctor	26	10.5
Obstetrician Nurse	10	4.0
Number of prenatal consultations		
1 to 3	149	60.3
≥ 4	78	31.6
None	20	8.1
Time to perform the first ultrasound		
≤14 Weeks of amenorrhea	64	25.9
> 14 Weeks of amenorrhea	145	58.7
Not done	38	15.4

Prenatal consultations were provided by midwives in 72.9% of cases.
Clinical description and outcome of low birth weight

Table IV: Distribution of low birth weight according to gestational age, age diagnostic tool, cause of low birth weight

Variables	Number (n=247)	Percentage
Gestational age in week of amenorrhea (SA)		
<28 Weeks of amenorrhea	1	0.4
28 to 31 Weeks of amenorrhea + 6 days	40	16.2
32 to 36 Weeks of amenorrhea + 6 days	160	64.8
≥37Weeks of amenorrhea	46	18.6

Variables	Number (n=247)	Percentage
Term Assessment Tool		
FARR score	181	73.3
Early ultrasound ≤14 weeks of amenorrhea	64	25.9
Date of last period	2	0.8
Causes of low birth weight		
Prematurity	201	81.4
Intrauterine growth retardation	46	18.6

The FARR score was the term evaluation tool in 73.3% of cases. In 81.4% of cases, prematurity was the cause of low birth weight.
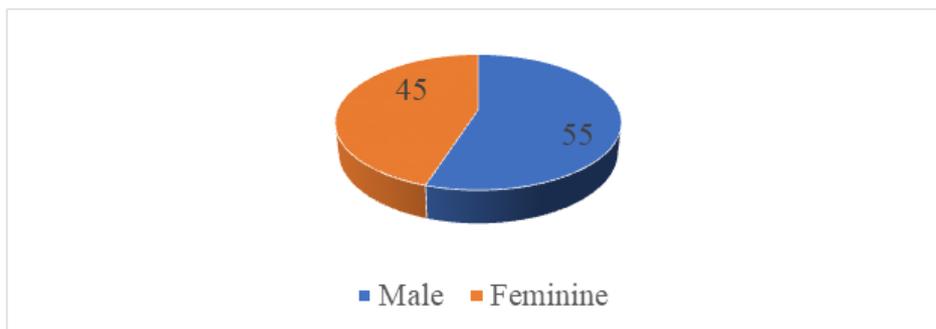
Graph 2: Distribution of low birth weights by sex

The male gender was predominant with a sex ratio of 1.2.

Table V: Distribution of low birth weights according to anthropometric birth parameters

Anthropometric parameters	Number (n=247)	Percentage
Birth weight		
< 2000g	182	73.7
> 2000g	65	26.3
Birth size		
< 40 cm	41	16.6
40 to 44 cm	123	49.8
≥ 45 cm	83	33.6
Cranial perimeter		
< 30 cm	53	21.4
30 to 33 cm	182	73.7
> 33 cm	12	4.9

Birth weight was less than 2000g in 73.7% with an average weight of 1731g and extremes of 915 to 2450g. The average sizes and head circumferences were respectively 42 cm and 30 cm with extremes of 31 cm to 50 cm and 27 cm to 35 cm.
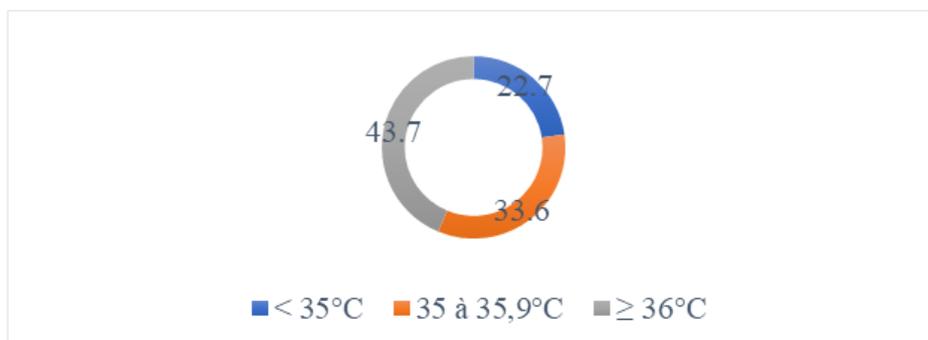

Figure 3: Distribution of low birth weights according to admission temperature

Low birth weights were received in hypothermia in 56.3% of cases with an average temperature of 35.6°C and extremes of 33°C to 38.9°C
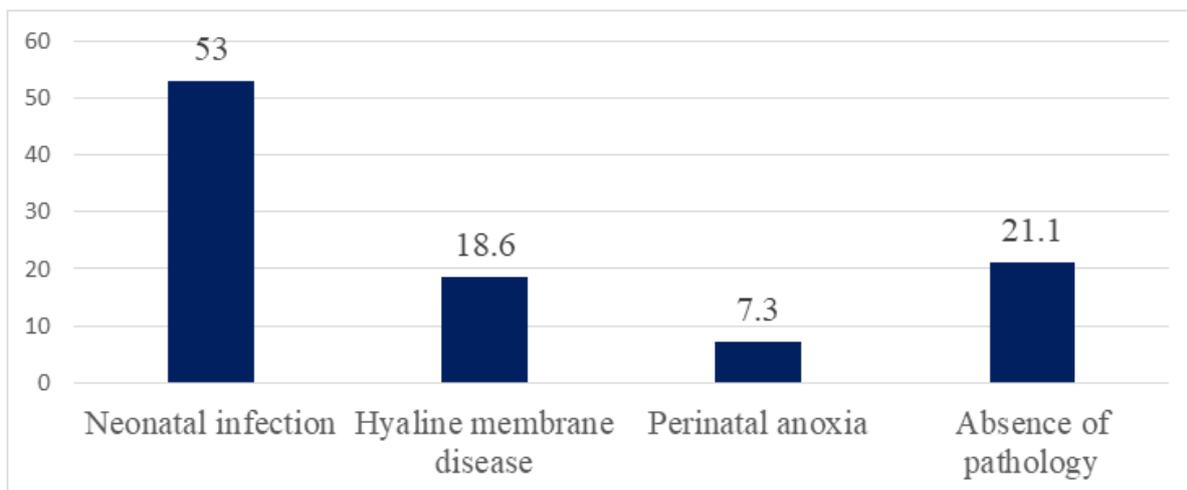

Figure 4: Distribution of low birth weight according to associated pathology

Neonatal infection was the main pathology associated with low birth weight in 53% of cases.

Table VI: Distribution of low birth weights according to the care pathway, by outcome and by cause of death

Variables	Number (n=247)	Percentage
Neonatology care pathway		
Stabilization in neonatology	115	46.6
Intra-hospital kangaroo	225	91.1
Ambulatory Kangaroo	224	90.7
Become		
Alive	224	90.7
Deceased	23	9.3
Cause of death		
Neonatal infection	13	56.6
Hyaline membrane disease	5	21.7
Cerebral anoxia	4	17.4
Wrong Way	1	4.3

Low birth weight patients benefited from stabilization care in neonatology in 46.6% of cases. Mortality among low birth weight patients was 9.3%. Neonatal infection was the main cause of death, accounting for 56.6% of deaths.

DISCUSSION
Epidemiological and socio-demographic data of mothers

From January to December 2020, the pediatric department received 1,702 newborns for neonatology consultations, including 247 low birth weights, representing a frequency of 14.5%. This frequency, comparable to that of Ignace Bwana Kangulu *et al*., in 2014 [11], Paul Makinko Ilunga *et al*., in 2016 [12] who respectively reported 14.3% and 13.0%, is lower than the 34.94% noted by Sanogo Y. in 2020 [10].

The majority, 69.6% of mothers, were aged 18 to 35 with an average age of 24.5 years and a range of 14 to 49 years. This result is similar to that of D.W.A. Leno *et al*., [13] who reported a mean age of 24.3 years with extremes ranging from 14 to 42 years. Traore B. M. *et al*., in 2016 [14] reported a mean age of 22.95±7.33 for mothers who gave birth to low birth weights. Studies have shown that maternal age of less than 18 years and 35 years or more is associated with low birth weight [11, 14]. Out-of-school mothers accounted for 49.8%, 79.4% were housewives. These results, close to the 37% of non-schoolers in Togo [15], differ from the 71.05% of non-schoolers and 40.22% of housewives reported in Guinea [13]. This observation is due to the synergistic effect of the low schooling rate of girls and the obstacles to the economic empowerment of women, the main ones of which are cultural and religious. The mother and low birth weight couples resided in commune I where the study took place in 59.92% of cases. Sanogo Y. [10] noted 22.96% residents outside the municipality. This fact is explained by the ease of geographical access to the centers by the populations of the localities.

Mothers' gynecological history data

First-time mothers represented 42.5%. Similar results were reported by Mariko, A. and Danfakha F. *et al*., respectively 37.1 and 40.4% of primiparous women [16, 17]. Other studies noted respectively 55.9% and 63.15% of primiparous compared to 27.4 and 24.81% of pauciparous [18, 13]. There is a relationship between parity (p=0.034) and gestational age (p=0.006) [14]. Pregnancy was associated with pathologies in 68.8% of cases including urogenital infections 45.7%, malaria 8.9%, high blood pressure 6.5%, anemia 5.3%. Sanogo Y. [10] reported 58.7% urogenital infections, 8.13% malaria. The same pathologies, at different rates, were reported in other studies with 30.83% anemia [13], 30.5% and 22.59% malaria [13, 18], 46.6% and 53.33% of arterial hypertension [13, 18] and 32.22% malnutrition [18]. In Mali, N. Telly *et al*., Noted an association between low birth weight and malaria (OR=8.53), hypertension (OR=2.57) and anemia (OR=2.87) [19].

Pregnancy monitoring data

Prenatal consultations were provided by midwives in 72.9%, gynecologists 21.6% and general practitioners 10.5% of cases. Pregnant women seek more help from midwives for reasons of modesty. Mothers had at least four prenatal consultations in 31.6% of cases and no prenatal consultation in 8.1% of cases. Different rates have been reported by studies where in 61.85% mothers carried out at least four consultations [17] compared to 10.52% with zero findings [10]. In 58.7% of cases, the first ultrasounds were performed after the 14 weeks of amenorrhea (SA) recommended for the dating ultrasound. This delay could be explained by the low socioeconomic level of mothers.

Clinical data and outcome of low birth weight

The gestational age of the majority of low birth weights, i.e. 64.8%, was 32 – 36 weeks. An opposite result was reported by the study of Sanogo Y [10] with 56.53% gestational age less than 32 weeks. The male sex represented 55% with a sex ratio of 1.2. Contrary to this result, Danfakha *et al*., [17] reported the opposite of 51.9% of girls compared to 48.1% of boys. The phenomenon of low birth weight affects gender without distinction; the discrepancy between the figures depends on the localities and periods of study. The use of the FARR score as a method of determining gestational age was 73.3%. Sangaré D [20] in 2017 used the Ballard score to determine the gestational age in 92% of premature babies. This observation is explained by the low level of education of mothers who are unaware of the benefit of the date of periods and ultrasound dating. Prematurity was the cause of low birth weight in 81.4% compared to 18.6% of cases of intrauterine growth retardation. A similar result was reported in 2016 where 80% [14] and 66.02% [10] of cases had a gestational age less than 37 weeks. The study revealed a birth weight below 2000g in 73.7% of cases, which is contrary to that of Cissé A. [21] who reported 83.10% birth weight between 2000 and 2499g. However, in 49.4% of cases, the birth weight was between 1500-1999g with an average weight of 1731g. This result is comparable to the 47.36% of cases with a weight of 1501 to 1999g reported by Sanogo Y. [10] in 2020. In 66.4% of cases, the height was less than 45 cm with an average of 42 cm. Sanogo Y reported a comparable result of 72.24% of cases measuring less than 47 cm with an average of 40.45 cm [10]. The average head circumference was 30 cm with extremes of 27 to 35 cm. This result is higher than the 27.2 cm average reported by Sanogo Y [10].

Low birth weights were treated with hypothermia in 56.3% of cases with an average temperature of 35.6°C. Sinanduku J. S *et al*., [22] reported 77% cases of hypothermia on admission. Immaturity of thermoregulation and insufficient body reserves predispose low birth weight to hypothermia. Low birth weights presented neonatal infection in 53% of cases, hyaline membrane disease in 18.6% and perinatal anoxia in 7.3%. Sangaré D. reported a comparable result of 43.20% associated neonatal infection [20].

In neonatology, the care pathway was marked by the stabilization phase in neonatology in 46.6% of cases, the in-house kangaroo mother care phase (91.1%) and the outpatient kangaroo mother care phase in 90.7% of cases. These results are comparable to the 49.5% hospitalization in neonatology [23] and higher than the 85.35% admitted to kangaroo mother care [10]. Mortality was 9.3%, i.e. 23 low birth weights, 22 of whom died during the stabilization phase and 1 case during the in-house kangaroo mother care phase. This mortality rate, similar to the 9.3% of deaths reported by Danfakha *et al*., in 2019 [17] is significantly lower than the 18.66% noted in another study [10]. This mortality rate, considered lower, is due to the fact that at the pediatrics of commune I of Bamako, all low birth weights received at the neonatology are systematically followed in a kangaroo mother care program for up to 18 months. Low birth weights died following neonatal infection in 56.6% of cases, hyaline membrane disease (21.7%), perinatal anoxia 17.4% and alimentary aspiration 4.3 % of cases. Sanogo Y. also reported 51.28% neonatal infection, 23.07% respiratory distress and 20.51% perinatal anoxia among the causes of death [10]. These causes of death are explained by immaturity and difficulties adapting to extrauterine life.

CONCLUSION

Low birth weight or low birth weight is a common phenomenon in neonatology. Neonatal mortality remains high in this layer. Apart from prenatal consultations and preventive measures (health and nutritional education) initiated since conception, postnatal follow-up in a kangaroo mother care unit helps to strengthen the chances of survival of low birth weights.

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