

Low birth weight newborn: epidemiological, therapeutic and evolutive aspects in the commune of Kara (TOGO) from 2014 to 2015

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Abstract

Introduction: Low birth weight (LBW) is the third leading cause of neonatal death after neonatal infections and asphyxia. **Objective:** Describe the epidemiological, therapeutic and evolutionary effects of LBW neonates. **Methods:** This was an analytical retrospective study from January 1, 2014 to December 31, 2015, in three neonatal units in Kara commune concerning the LBW newborn. The main parameters studied were clinical, therapeutic and evolutionary. **Results:** Of 1712 newborns hospitalized, 527 were LBW (30.8%) of which 451 were included with 222 males (sex ratio 0.97). The average birth weight was 1775.72 g. Delivery was carried out through caesarean section in 16.9% mainly did about eclampsia (29.5%) and prævia hemorrhagic placenta (12.6%). The main co-morbidities were neonatal infections (55.4%) and perinatal asphyxia (12.9%). The treatment consisted of an antibiotic therapy (73.8%), an exclusive breastfeeding (43.7%) and Kangaroo Maternal Care (30.2%). Immediate results were marked by deaths in 18.8% after an average of 6 days hospital admission. The main factors significantly related to neonatal mortality were the early neonatal period, low sucking, hypotonia, high preterm birth, very LBW, inadequate pregnancy monitoring, referrals, perinatal asphyxia, artificial breastfeeding. **Conclusion:** The incidence of LBW remains high with significant mortality due to preventable factors, requiring actions to be coordinated from conception through the end of the period to improve the survival of these newborns.

Key words: Low-birth-weight, newborn, morbidity, outcomes, Togo.

Introduction

Neonatal infections, low birth weight (LBW) and perinatal asphyxia are the three leading causes of neonatal deaths [1, 2] in developing countries. In Africa between 1998 and 2008, the prevalence of LBW varied from 7 to 17% depending on the areas and periods of study[3]. LBW is a multifactorial health problem for which the prevention is possible through targeted interventions on modifiable factors

[4, 5]. In Togo, in 2013, neonatal mortality was 2.7%. Newborns accounted for 32.3% deaths among of children under five and 11.6% of these deaths were premature births and LBW neonates [6]. Most of the LBW studies in Togo were conducted in Lomé [7, 8]. We have carried out this study in order to assess the situation of the LBW in Kara, a region in the northern Togo. Our objective was to describe the epidemiological, therapeutic and evolutionary aspects of LBW in the pediatric ward in Kara commune.

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Materials and Method

Place of study: The study was carried out in the city of Kara, 420 km north of Lomé, in the pediatrics departments respectively at Kara Teaching Hospital, Regional Hospital of Kara-Tomdè and the SOS-VE Mother and Children Hospital of Kara,

which are the main centres of reference and children's hospitalisation.

Type and period of study: It was a retrospective analytical review of LBWs' records in these units from January 1, 2014 to December 31, 2015 (24 months).

Results

Out of the 1712 newborns identified in the three centres surveyed, 527 had LBW(30.8%) of which 451 met our inclusion criteria. They were divided into 222 boys and 229 girls (sex ratio of 0.97). Hypotrophic newborns accounted for 34.9% of the lbws and premature babies, 65.1%.

Perinatal data- The average parity (n = 208 cases) of LBW mothers was 2.80 children per woman (extreme from one to ten), 98 mothers were primipara (31.9%) and 39 were large multipara (14.44%). In the mothers' histories, we counted 30 cases of abortions, 10 high blood pressure cases (HPB), three cases of uterine scarring, two cases of LBW and two cases of multiple pregnancies.

The number of prenatal consults(n=205 cases) in LBW pregnancy follow-up ranged from one to nine with an average of three prenatal consults. The weeks of pregnancy (n = 212 cases) ranged from 24 to 42 weeks.

The very premature babies (gestational age under 33 weeks) accounted for 52.8% of LBW, the preterm infants of 34 at 36 weeks of gestational age represented 12.3%. Of the 451 LBW newborns surveyed, 104 were from multiple pregnancies (23.1%) of which 98.1% are twins.

These pregnancies have been marked by a number of some pathologies: viral hepatitis B (12 cases), HIV infection (11 cases), malaria (3 cases), toxoplasmosis (1 case), and asthma attack (1 case).

With regard to the place of birth (n = 386), childbirth occurred at the maternity of the three studied centres in 288 cases (63.9%), in other health facilities in 80 cases (17.7%) and at home in 18 cases (4%). The delivery was performed through vaginal in 375 cases (83.1%) and by caesarean section in 76 cases (16.9%).

Eclamptic seizures (27.6%), anamnios or severe oligoamnios (11.8%), previa hemorrhagic placenta (11.8%), excessive uterine height (9.2%) and acute fetal distress (9.2%) were the main indications of caesarean sections, to a lesser extent neglected shoulders (5.3%) and bi-cicatricial uterus (5.3%).

Clinical data- The Apgar score at birth was reported in 245 cases. It was less than 7 in 58 cases (23.7%) at the first minute (of which 10 in apparent state of death), in 28 cases at the 5th minute and in 12 cases at the 10th minute.

The neonatal resuscitation has been reported in 33 cases. Birth weight (n = 445 cases) ranged from 750 g to 2475 g with an average of $1775.72 \pm 408,75$ g.

LBW from 1500 to 1999g represented 148 cases (48.83%), very LBW from 1000 to 1499g represented 93 cases (20.9%) and extreme LBW (750-999g) constituted 9 cases (2%).

Inclusion criteria: We had included all hospitalized newborns in one of the three centres with a birth weight lesser than 2500g. Newborns weighing ≥ 2500 g and stillbirths were excluded.

Parameters studied: The main parameters studied concerned the monitoring of pregnancy and childbirth, the birth status of newborns, clinical and therapeutic data and the immediate prognosis.

Statistical methods: The processing and analysis of data was done using the Excel software, EPI Info version (TM) 3.5.1. We used chi-square test to compare some variables with a significance threshold of 0.05.

The size of these LBW newborn ranged from 27 cm to 50 cm with an average of 41.75 cm. Clinically, 135 cases were identified (29.9%) of hypothermia (<36 ° C) and 117 cases of fever (25.9%). Some pathologies were mainly associated with LBW at their admission: neonatal infections (55.4%) and perinatal asphyxia (12.9%), neonatal respiratory distress (2.9%), haemorrhagic diseases of the newborn (1.1%), congenital malformation (0.9%), anemia (0.4%) and dehydration (0.4%).

Data relating to care and support- The time frame for transferring LBW between maternity and neonatal services at the same centre varied from 5 minutes to 48 hours. This delay was on average 12 hours in the case of referral from a maternity ward to that of neonatology of another centre; 55.65% of LBWs (251 cases) were transferred within the first 24 hours.

The care received by these newborns was essentially a metabolic contribution by glucosate serum (78.0%), a heating with plate or incubator (76.7%), antibiotic therapy (73.8%), exclusive breastfeeding (43.7%), and Kangaroo Mother Care or KMC (30.2%). The antibiotic treatment consisted mainly of a double antibiotic therapy (63.4%) combining gentamycin for three to five days and ceftriaxone or cefotaxime (Table-I).

Outcome data- The discharge weight ranged from 700 to 2920 g with an average hospitalization time of 6.07 ± 4.7 days (one to 30 days).

The evolution was favorable in 302 cases (67%), 85 LBW had died (18.8%) and therest being escapes or exits against medical advice (14.2%). A variety of pregnancy-obstetrical factors have been associated with LBW's mortality.

Inadequate pregnancy monitoring, referrals of LBW from another centre, high prematurity, veryLBWand perinatal asphyxia were the main factors significantly related to death (Table-II).

Table-I: Distribution of low birth weight based on treatment received.

Treatment	Number	Percentage
Glucosate serum	352	78.0
Warm-up by plate-warming or incubator	346	76.7
Antibiotics	333	73.8
Gentamycin	333	73.8
Cefotaxime	196	43.5
Ceftriaxone	169	37.5
Ceftriaxone then cefotaxime	19	04.2
Ampicillin	62	13.7
Breastfeeding	197	43.7
Kangaroo Maternal Care (KMC)	136	30.2
Oxygenation	68	15.1
Antipyretic	68	15.1
Multivitamins	58	12.9
Vitamin K1	18	04.0
Anticonvulsant	11	02.4
Aspiration	04	00,9
Phototherapy	01	00.2

Table-II: Development of low birth weight based on pregnancy-obstetrical data.

Pregnancy-obstetrical data	Death	Cure	Unknown	Total	Value of p
Partitioning					
[0-3]	31	117	21	169	0,30
[4-10]	4	32	3	39	
Unspecified	50	153	40	243	
Twinness					
Yes	69	223	53	345	0,25
No	16	79	11	106	
Antenatal visits					
[0-3]	26	111	17	154	0,0203
4 and more	3	41	7	51	
Unspecified	56	150	40	246	
HIV serology					
Positive	5	5	1	11	
Negative	14	69	7	90	0,057
Unspecified	66	228	56	350	
Admission method					
Internal transfer	37	219	32	288	0,000007
Referral / consultation	23	50	25	98	
Unspecified	25	33	7	65	
Weeks of Pregnancy					
[24 - 32]	25	65	5	95	0,0017
[33 - 36]	7	33	3	43	
[37 - 42]	4	54	16	74	
Unspecified	49	150	40	239	
Delivery method					
Vaginale	77	237	61	375	0,042
Caesarean section	8	65	3	76	
Perinatal asphyxia					
Yes	14	13	0	27	0,000002
No	21	167	30	218	
Unspecified	50	122	34	206	
Birth weight (g)					
[750-999]	5	3	1	9	0,0000003
[1000-1449]	28	57	8	93	
[1500-2499]	47	241	55	343	
Unspecified	5	1	0	6	

Therapeutically, mortality was significantly related to artificial breastfeeding, insufficient intake of calories (glucosate serum), first week of hospitalization, and LBW less than 7 days old (Table III).

Table-III: Evolution of low birth weight based on support.

Support elements	Death	Cure	Unknown	Total	Value of p
Care centres					
Kara Teaching Hospital	44	141	24	209	0,135
Regional Hospital of Kara-Tomdè	18	95	20	133	
SOS-VE Children and mother Hospital	23	66	20	109	
Global diagnosis					
Hypotrophy/isolated prematurity	33	117	24	177	0,48
Neonatal infection	44	173	33	250	
Neonatal Suffering	8	12	7	27	
Glucosate serum infusion					
Yes	25	57	17	99	0,032
No	60	245	47	352	
Type of milk given to newborn baby					
Breast milk	20	156	21	197	0,0001
Artificial milk	8	5	2	15	
Breast milk and artificial milk	2	7	0	9	
Unspecified	55	134	41	230	
Weight gained					
Yes	5	158	21	183	0,49
No (stationary weight or loss)	7	149	34	180	
Unspecified	73	0	9	88	
Duration of hospitalization (in day)					
[0-7]	57	193	56	306	0,0000002
[8-30]	2	109	6	117	
Unspecified	26	0	2	28	
Age of exit in daylight					
[0-7]	42	164	46	252	0,00012
[8-31]	8	138	18	160	
Unspecified	35	0	4	39	

Discussion

The retrospective nature of this study did not allow the collection of certain data related to incomplete files filling and the imprecision of certain diagnoses. Beyond these, this study provides an overview of LBWs' support in Kara that can serve as a starting point for future studies on the subject.

Epidemiological aspects- LBWs new borns accounted for 30.8% of hospitalized newborns, as reported in a previous study (29.71%) in the same ward [9]. In 2002, premature infants accounted for 11.1% in Lomé (Togo) out of 1672 live births [8]. This frequency varied in Africa from 8.5% in Nigeria [10] to 15.1% in Madagascar in 2010 [11] for premature births. This high frequency of LBWs at Kara is explained by its report only to

hospitalized newborns and highlights the weight and the problems associated with the support of these LBW newborns.

Diagnostic aspects- LBWs' mothers were in 31.9% of the cases primiparous women and 14.44% were multiparous. Primiparity especially among young mothers and multiparity are reported as predictors of LBW [8, 10, 11]. Abortions (30 cases) and HBP (10 cases) were the dominant antecedents among mothers of the LBWs: abortions were reported in 44.25% in 2005 in Nigeria [10] while the HBP ranked first in Tanzania [12]. In 2002, in Lomé, maternal pathologies as infections (36%), malaria (22%) and ovular abnormalities (12 to 34%) were the conditions associated with premature infant in the study of Balaka et al. These authors have also

reported a pathological obstetric history (17.2%), voluntary abortion (11.3%), inadequate prenatal monitoring (66.6%), a low level of education (38.7%) and excessive physical activity (29%) as factors significantly related to prematurity [8]. The importance of pathologies associated with LBW seems to depend on geographical regions, socio-economic level and diagnostic means.

The average of antenatal visits during pregnancy was 2.79: this deficiency in pregnancy follow-up is accentuated in developing countries, where unfavorable socio-economic conditions influence pregnancy follow-up and would favor LBW [13-14]. Multiple pregnancies, one of the LBWs' causes (23.1%), was also reported in a less proportion (17.7%) in Lomé [8]. Compared to delivery, caesarean section was reported in 16.9% in this study with the main indication of pregnancy toxemia (29.5%). Vaginal delivery could have been the preferred mode of delivery of LBW because of the smallness of the fetal motive. The caesarean section is the sanction in relation to specific or general causes that may endanger the life of the mother and the already fragile newborn.

Clinically, 29.9% (135 cases) of hypothermia were found as in the case of the 29.0% found on admission in Ghana [15]. It may be linked to a failure of its prevention or to a neonatal infection and should be sought for better care. Neonatal infections (55.4%) and perinatal asphyxia (12.9%) were the two main associated comorbidities in the LBWs. The importance of perinatal asphyxia in neonatal deaths has for some years now justified the resuscitation trainings "Help Baby Breath" [16].

Support and evolution of LBW infants- The average time taken to transfer LBW newborns was 12 hours for referral from another centre. This delay seems relatively long due to insufficient medical means of transportation and the financial resources of the parents who provide the care themselves. All actors must work to act on the different types of delays (decision-making, consultation, diagnosis and support) in order to improve the care and lbw prognosis.

Three-quarters of the LBWs have received antibiotic therapy, with neonatal infection being one of the most common causes of LBW[1, 4] but paraclinical confirmation is sometimes difficult to achieve in

our regions. It is necessary for services to have a neonatal infection care protocol to which staff is trained to avoid complications and death.

Parenteral nutrition with lipid and protein substances is limited in this context while the risk of dehydration and hypoglycemia remains high: 78.05% of the LBW newborns were hydrated with glucose and ionic salts without a defined protocol. As a result of this limitation, LBW feeding has become more dependent on breastfeeding when conditions permit or artificial milk for premature infants if breastfeeding is not feasible. It is essential that a fairly precise way of feeding the LBW newborn be set up to enable the paramedical team to carry it out.

For the warming-up of the LBW newborn, the KMCs were mentioned in 30.2% contrary to the use of incubators or warming plates (76.7%). Several studies have demonstrated the clinical, therapeutic, evolutionary, psycho-affective and socio-economic benefits of KMC [17]. KMCs make it possible to compensate for the lack of material, financial and human resources: their extension in our neonatology services would significantly reduce LBW newborns mortality.

Per the progress, LBW newborns were discharged on the recommendation of a medical doctor in 67% for an average hospitalization period of 6.07 days with longer stays depending on very and extreme LBW[8]. The relatively short period of stay of our LBW newborns could be explained by an improvement in the care provided, related to the introduction of KMC, but above all by a limitation in the availability of places, outings due to parents' financial restrictions. The trend was deadly in 18.8%, far less than 30.1% in preterm infants during the year 2002 in Lomé, where the risk of death is twice as high (60.9%) in premature infants under 31 weeks of pregnancy and three times higher (93.7%) in LBW newborns of less than 1000g[8]. The death rate in this study, however, shows all the potential of KMC method.

Predictive evolutionary factors of low birth weight mortality- Mortality in LBW newborns was statistically related to the early neonatal period, low sucking, hypotonia, high prematurity, very LBW, insufficient prenatal visits and pregnancy monitoring, referrals, perinatal asphyxia, artificial

breastfeeding and to the first week of hospitalization. The results are similar to those commonly found in the literature where other factors such as maternal backgrounds and neonatal infections have also been mentioned [7-8]. LBW infants are poorly tolerant of labor and vaginal delivery; they have a higher incidence of asphyxia, more pronounced in the premature than the hypotrophic infant, resulting in early and effective treatment [18].

Extramural transfers of newborns, especially LBW newborns, area significant risk of neonatal mortality: in Cameroon in 2006, newborns in contact with the outside environment had 26.4% mortality rate compared to 16.1% in the group that had not been exposed [18]. Often non-medicalized non-aseptic birth and transfer conditions expose newborns to infections and other complications such as hypothermia and hypoglycemia.

The first week of admission and artificial breast-feeding were significantly related to death causing an effective intensive care management and feeding of the LBW newborn problem at the beginning of hospitalization. This justifies an improvement in the care of newborns at birth as well as the availability of qualified personnel in the various structures to improve the prognosis of the LBW.

Conclusion

Various avoidable factors have been linked to LBW occurrence such as poor pregnancy monitoring, previous abortion, eclampsia and HBP. The main comorbidities were neonatal infection and perinatal asphyxia. LBW newborn's management has been limited by the insufficiency of the technical and therapeutic facilities. In the absence of a remarkable improvement in the socio-economic status of populations, linked to the global economic situation, an integrated development program for perinatal medicine taking local realities into account could help to improve the prognosis of LBW neonates in developing countries. The survival of the LBW depends on the availability of neonatal care unit in the centre. Pregnancy women must be educated to avoid LBW and complications related to these fragile babies.

Keys words: low-birth-weight, newborn, morbidity, outcomes, Togo.

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Add a list of abbreviations used at the end of the article before the reference

HPB (high blood pressure cases), LBW (Low-birth-weight), KMC (Kangaroo Maternal Care)

Contribution by authors

1. AZOUMAH KD: concept, analysis, editing and supervision
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3. DOUTI KN: data analysis, editing.
4. AHOANKPO KA: data acquisition, analysis, writing.
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7. DOUAGUIBE B: drafting of the work, writing
8. BALAKA B: analysis, editing.
9. AGBERE AD: Concept and supervision.

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