

Perinatal Morbidity and Mortality in the Regional University Teaching Hospital of Borgou (BENIN) In 2013

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Abstract

Introduction: Perinatal mortality is still high in the developing countries, with a significant proportion for early neonatal mortality. Its reduction depends on identification of causes in view of priority actions to achieve the fourth Millennium Development Goal.

Objective: Describe perinatal morbidity and mortality in the major hospital facility of North-Benin.

Settings and method: It was a cross-sectional, descriptive and prospective study conducted over the period from March 1 through August 31, 2013 in the Mother & Child Unit of the Borgou Regional University Hospital (CHUD-Borgou) located in Parakou i.e. in the North-Benin.

Findings: Perinatal mortality rate was 153.55% still birth rate 87.39% and early neonatal mortality rate 66.16%. Fetal suffering (48.21%), morbidity associated with fetal membranes, through premature rupture of the membranes (60.58%) and neonatal morbidity through neonatal infections (26.32%) were the leading causes of fetal morbidity. Fetal suffering (31.43%) was the leading cause of late fetal deaths; and neonatal infections (33.96%), prematurity (28.30%) and perinatal asphyxia (18.87%) were the leading causes of early neonatal deaths.

Conclusion: Perinatal mortality is high in the Borgou Regional University Teaching Hospital (CHUD). Its reduction requires a holistic approach based on new-born care policy.

Keywords: Perinatal mortality; Perinatal morbidity; Perinatal asphyxia; Benin

Introduction

Perinatal mortality rate (PMR) is a reliable indicator of the quality of obstetrical and paediatric care [1]. According to the 2009 UNICEF Report, neonatal mortality declines more slowly than mortality of children under five years of age [1]. In fact, out of the 130 million annual births, 4 million die during the first four weeks of their life. The 3/4 of those deaths occurs during the first week [2]. About two thirds of those deaths occur in Africa and in Southeast Asia against one third for the rest of the world, thus showing the gap existing between rich and poor countries [3]. In Benin, a study performed in the National University Teaching Hospital of Cotonou (CNHU- Cotonou) in 2009 reported a 122% perinatal mortality (PM) [4]. CHD-Borgou is the major hospital facility in North-Benin and perinatal mortality which is the lower indicator of a country's obstetrical and health status is little known there; thus the interest of this research work which aimed to describe perinatal morbidity and mortality in the major hospital facility in the North-Benin.

Setting and Methods

The study was carried out in the Mother and Child Unit of the Borgou Regional Hospital (CHD-Borgou), located in Parakou in the North-Benin. CHD-Borgou is a second-level referral center in the health pyramid/system of Benin. It has become a university teaching hospital since the University of Parakou was founded in 2002. This investigative work is a prospective and descriptive study conducted during the period from March 1 to August 31, 2013. Sample minimum size was calculated using the Schwartz formula $N = (Z\alpha)^2 \times pq/i^2$; where N is the expected minimum sample ($Z\alpha$): Z-score of normal distribution, equal to 1.96 for $\alpha = 5\%$, p the perinatal mortality identified in CNHU-Cotonou in 2009 [4] which is equal to 12.2%, q the complementary event of probability i.e. 1-p: 87.8% and i the accepted margin of error i.e. 5%. According to that formula, sample minimum size was 165.

The study involved:

- all the live-born infants followed up during the first seven days of life and whose perinatal outcome was known, delivered at the end of at least 22 weeks of amenorrhea or weighing at least 500 g when due date was not known, after parents' informed consent.

- All the still-born delivered from pregnancy of at least 22 weeks of amenorrhea and/or weighing at least 500 g in the delivery ward of the CHD-Borgou maternity, after parents' oral informed consent.

-The live-born infants whose condition was unknown on the 7th day of life (new-born's lost to follow up) were excluded.

Sampling without replacement and consecutive sampling were used.

Data were collected using a form of survey based on interview with the mother, and by also using mother's obstetrical record and new-born medical record if the latter was hospitalized in the CHD-Borgou neonatal care unit.

The study variables were socio-demographic characteristics of mothers and products of conception, mothers' clinical characteristics, new-borns' characteristics, perinatal morbidity, fetal morbidity, morbidity associated with the fetal membranes, early neonatal morbidity and perinatal mortality.

Definitions used for variables related to perinatal morbidity and mortality

Live births: products of conception of at least 22 weeks of amenorrhea (WA) who showed any sign of life after delivery [5]

Stillbirth: products of conception of at least 22 WA who did not present with any sign of life after delivery [5]

Early neonatal mortality : death occurred within the seven days after birth of a product of conception of at least 22 WA [5]

Clinically-apparent neonatal infection: presence of any physical or biological sign (positive CRP or leukopenia lower than 5000/mm³ or hyperleukocytosis higher than 25000/mm³ or thrombocytopenia lower than 100000/mm³, or pleiocytosis higher than 10 elements /mm³)

Perinatal asphyxia: condition of any new-born with an APGAR score lower than 4 to 1 minute of life or lower than 7 to 5 minutes of life

Prematurity: childbirth on or after 22 WA but before 37 WA

Intrauterine growth retardation (IUGR): birth weight below the 10th percentile of intrauterine growth curves

Respiratory distress: association of at least the following 2 signs (bradypnea, tachypnea, signs of struggling to breathe, central cyanosis)

Congenital malformation: congenital morphological anomaly of an organ or part of the body which is detectable or occurs from birth.

Neonatal jaundice: yellow discoloration of skin and mucous membranes due to a hyperbilirubinemia higher or equal to 40 mg/l

Anemia : hemoglobin level lower than 14 g/l

Congenital malaria: positive thick blood smear, regardless of new-born clinical condition

Hemorrhagic syndrome: spontaneous bleeding in the new-born

Neurological disorder: clinical condition characterized by an altered consciousness or chronic seizures

Macrosomia: birth weight above the 90th percentile of intrauterine growth curves.

To identify gestational age, chronological due date or ultrasound due date (early ultrasound) were used. In the absence of chronological or ultrasound due date, weight of the product of conception higher or equal to 500 g was used to include statistical units.

Data were recorded and processed using EPIINFO software 7.1.1.14 version. To describe them, ratios and averages (with standard deviation) were respectively calculated for qualitative and quantitative variables.

Word processing and design of graphics were performed using Word and Excel software.

For ethical reasons, the anonymity of new-borns and of their mothers was respected. Besides, confidentiality of the data collected was observed and inclusion of each statistical unit was previously submitted to mother for oral informed consent.

Results

During the study, 801 new-borns were involved they were born of 765 pregnancies, including 728 mono-fetal (95.16%), 36 twin pregnancies (4.70%) and one triplet pregnancy (0.13%).

Sociodemographic characteristics of mothers and products of conception

Table 1 shows the distribution of mothers according to their sociodemographic characteristics.

Characteristics	Numbers	Percentage (%)
Maternal age		
Lower or equal to 18 years	43	5.62
Between 19 and 34 years	626	81.83
Higher or equal to 35 years	96	12.55
Living environment of mothers		
Urban	618	80.78
Rural	147	19.22
Educational status of mothers		
Non-educated	311	40.66
Primary school	185	24.18

Secondary school	198	25.88
University	71	9.28

Table 1: Distribution of mothers according to their socio-demographic characteristics.

Clinical characteristics of mothers (N=765)

Mothers were primigravida, paucigravida and multigravida in respectively 25.79%, 39.13% and 35.08% of the cases.

Nulliparous and primiparous represented respectively 19.11% and 19.37% of the cases. Mothers were pauciparous and multiparous in respectively 4% and 35.08% of the cases.

Twenty-four percent (24%) of the mothers had an abortion history.

One still-born history and one neonatal death history had been found out in respectively 7% and 7.72% of the mothers.

Concerning antenatal care (ANC), 4.97% of the mothers had not benefitted from any, 36.13% received between 1 and 3 ANC and 58.90% attended at least 4 ANC.

Mothers reported to the maternity for delivery by their own in 50% of the cases. They were referred from a peripheral health facility in 50% of the cases.

The main reasons for referral were dystocia (21.07%), acute fetal suffering (14.97%), reno-vascular syndrome (12.44%), premature rupture of the membranes (PRM), uterine scar, dystocia presentation for 7.81% each.

Mothers had normal pelvis in 69.5% of the cases and abnormal in 29.5% of the cases.

A pathological rupture of the membranes (premature, early or prolonged) had been noted in 37.88% of the cases.

Clinical characteristics of new-born's (N= 801)

Table 2 shows the distribution of new-born's delivered in CHD-Borgou from March 1 through August 31, 2013 according to pregnancy due date.

Vaginal birth was registered in 416 new-born's (51.93%). In 3.74% of the cases (30 subjects), birth weight was between 500 and 999 g ; it was between 1000 and 2499 g in 21.10% of the cases (169 subjects) and between 2500 and 4000 g in 74.66% of the cases (598 subjects). Four new-born's (0.50%) had a birth weight higher than 4000 g.

New-borns were male in 54.3% of the cases (435 subjects) and female in 45.69% of the cases (366 subjects), i.e. a 1.18 sex-ratio.

Among the live 731 new-born's (92.26% of 801), perinatal asphyxia was diagnosed in 97 subjects (13.26%); APGAR score was lower than 4 to 1 minute of life in 8 live new-born's (1.09%) and lower than 7 to 5 minutes in 89 (12.17%).

Due date (WA)	Number	Percentage (%)
22-27	15	1.87
28-32	39	4.87
33-36	77	9.61
37-42	478	59.68
43 and more	8	1.00
Inaccurate	184	22.97
Total	801	100.00

Table 2: Distribution of new-born's delivered in CHD-Borgou from March 1to August 31, 2013 according to pregnancy due date.

Perinatal morbidity

Fetal morbidity (N=801): Fetal morbidity had been noted in 392 subjects (48.93%). The abnormalities observed were acute fetal suffering in 189 subjects (48, 21%), faulty presentation in 101 subjects (25.75%), multiple pregnancies in 36 subjects (9.18%), and threat of preterm birth in 27 subjects (6.89%). Cephalopelvic disproportion, passing the due date, abnormal volume of amniotic fluid, and blighted infection were noted in respectively 4.86%, 2.04%, 2.04% and 1.02% of the cases.

Morbidity associated with the fetal membranes (N=801): Abnormalities of fetal membranes were identified in 137 fetuses (17.10%); these were premature rupture of the membranes (60.58%),

coils of funis (18.98%), placenta previa (10.95%) and cord prolapse, in 9.49% of the cases.

Early neonatal morbidity (N=801): Four hundred thirty-seven new-born's (54.55%) needed care in the neonatal care unit. The pathologies identified are listed in Table 3.

Morbidity	Number (n = 437)	Percentage (%)
Clinically-apparent INN	115	26.32
Perinatal asphyxia (PNA)	97	22.2
Prematurity	90	20.59

Hypotrophy	57	13.04
Respiratory distress (RD)	18	4.12
Congenital malformations	18	4.12
Jaundice	16	3.66
Congenital malaria	13	2.97
Anemia	9	2.06
Hemorrhagic disease	2	0.46
Neurological disorder	2	0.46

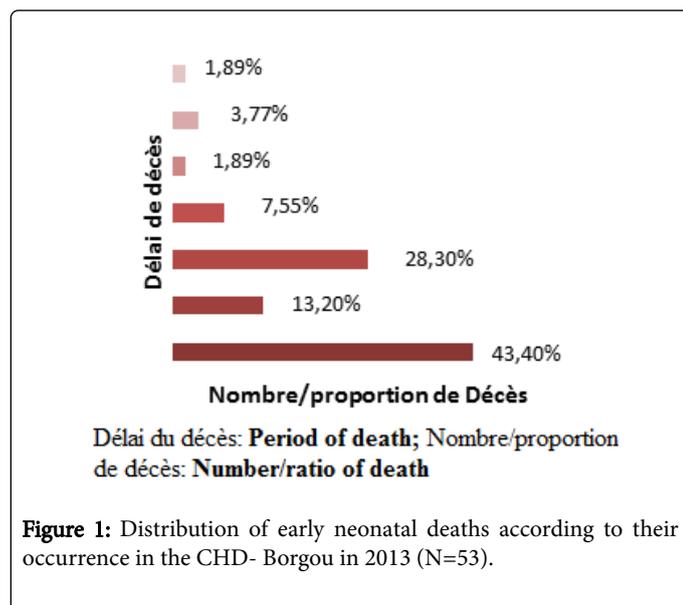
Table 3: Frequency of early neonatal morbidity in CHD-Borgou from March 1 to August 31, 2013.

Perinatal mortality (N=801): During the study period, a total of 801 births were registered, including 731 live births. The number of perinatal deaths was 123, including 70 late fetal deaths and 53 early neonatal deaths.

Late fetal mortality rate (number of late fetal deaths over total number of births) was 87.39%. Early neonatal mortality rate (number of early neonatal deaths over total number of births) was 66.16%. Perinatal mortality rate (number of perinatal deaths over total number of birth) was 153.55%.

Out of 123 deaths registered, 41 occurred in the antenatal period (33.33%), 29 in intrapartum (23.58%), 7 during intensive care (5.69%) and 46 after transfer to the neonatal care unit (37.40%).

Figure 1 shows the distribution of early neonatal deaths according to period of occurrence. More than 2 deaths out of 5 occurred within the first 24 hours of life.



Causes of death: The most common causes of stillbirth (N=70) identified were acute fetal suffering in 31.43% of the cases, abruption placenta or uterine rupture in 17.14% of the cases and blighted infection in 10.00% of the cases. The other causes were placenta previa (5.71%), funicular abnormalities (4.29%) and dystocia (2.86%). The causes were unknown in 28.57% of the cases.

The causes of early neonatal deaths (N=53) were neonatal infection in 18 cases (33.96%), prematurity in 15 cases (28.30%), perinatal asphyxia in 10 cases (18.87%), respiratory distress in 8 cases (15.09%) and multiple congenital malformation in 2 cases (3.78%).

Discussion

Mortality

Perinatal mortality: Perinatal mortality rate in the CHUD-B in 2013 was 153.6%. In the literature, a significant variability of perinatal mortality rate between countries is noted, with a big gap between developed countries and developing countries. In this respect, while French authors reported a perinatal mortality of 10.7%, [6,7]. African authors such as Bayou et al. in Ethiopia in 2012 [8], Cissé et al. in Senegal in 2006 [9] and d'Almeida et al. in Benin in 2009 [4] reported respectively rates of 124%, 169.89% and 122.40%. The high rate of 153.55% found out in this research work may be due to the conjunction of many factors. First, there is the agreed threshold of viability (gestational age higher or equal to 22 WA or birth weight higher or equal to 500g) to take into account the WHO recommendations [5]. Then, there is the recurring issue of lack of technical facilities and appliances in developing countries. Faced with that high rate, a proactive policy for new-born care proves to be necessary for reducing perinatal mortality.

Perinatal morbidity and causes of death: During the fetal period, the two most common morbidities identified were acute fetal suffering (AFS) and premature rupture of the membranes (PRM). Those abnormalities were identified by many African authors. In fact, Minko et al. in Gabon in 2004 [10], Nagalo et al. in Burkina Faso in 2013 [11] identified respectively 61.95% and 53.5% of PRM. Those common fetal morbidities raise the issue of good practices in obstetrics in a context of poverty where refocused antenatal care and good use of partograph to ensure labor monitoring may be very beneficial.

During the early neonatal period, neonatal infections (NNI), perinatal asphyxia and prematurity were the leading causes of morbidity. Those three morbid conditions which cause high numbers of neonatal deaths are reported by several African authors [9,11-14]. Their high proportion in neonatal mortality may be due to our context characterized by a lack of sanitation, health education, health workers' compliance with recommendations based on clinical evidence and good practice of neonatal intensive care.

Acute fetal suffering (AFS), placental abruption (PA) and blighted infection are the leading causes of fetal deaths. The significant proportion of AFS among the causes of fetal deaths highlights the early diagnosis issue through an efficient labor monitoring using partograph for rapid extraction of the fetus. In addition to that, there is lack of intensive care in the labor ward. These remarks were made by Traoré et al. in Mali in 2011 [15] and d'Almeida et al. in Benin in 2009.

The three main causes of death identified during the early neonatal period were neonatal infection, perinatal asphyxia and prematurity. These causes are the ones identified by other authors from the sub-region such as Edmond et al. in Ghana in 2008, [16] Udo et al. in Nigeria in 2008 [17]. To fight efficiently against those three modifiable causes of neonatal death, particular prevention and management measures are required in our context where infant and child mortality is still affected by stagnant neonatal mortality.

Conclusion

This study which aimed to describe perinatal morbidity and mortality in the Borgou Regional University Teaching Hospital in 2013 has shown that about one out six new-borns died during the perinatal period. Moreover, it has pointed out the main causes of fetal death which are AFS and placental abruption. It has also identified the causes of early neonatal deaths which are neonatal infection, perinatal asphyxia and prematurity. In order to reduce that high perinatal mortality rate, it is necessary to review its associated factors in order to develop an appropriate new-born care policy.

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