



Perinatal Morbidity and Mortality in Kinshasa: Prevalence and Risk Factors in Hospitals Environment

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Abstract

Purpose: The purpose of this study is to determine the prevalence and risk factors of perinatal morbidity and mortality in hospitals in the City Province of Kinshasa. **Material and Methods:** We carried out a cross-sectional survey with a correlational aim among 456 mothers selected in two health zones of the Provincial Health Division of Kinshasa. Data were entered in Excel 2013 and then exported to SPSS 21 software for statistical analysis. The determination of risk factors for perinatal morbidity and mortality is made possible thanks to logistic regression at the significance level of 0.05. **Results:** The prevalence of prematurity in the hospital setting was 13.8%; that of low birth weight was 5.6% and the perinatal mortality rate was 50.4 per thousand live births. Logistic regression analysis showed that the risk factors for perinatal morbidity and mortality included polygamy, primigravida, heavy work during pregnancy, presence of at least two pathologies during gestation, lack of vaccination against tetanus, and childbirth outside of a health facility. **Conclusion:** In order to guarantee the security of perinatal life, it will be necessary to improve the socio-demographic, economic and cultural conditions of the mother and to offer her quality care during the pre-per and post-natal period.

Subject Areas

Public Health

Keywords

Morbidity, Mortality, Perinatal, Hospital Environment, Prevalence, Risk Factors

1. Introduction

The problems generated by pregnancy and childbirth affect the health of the mother, the fetus and the newborn, if preventive measures are inadequate or insufficient [1]. This repercussion results in perinatal morbidity and mortality, which constitutes a real public health problem and a major concern throughout the world [1].

The World Health Organization (WHO, 2018) reports that in 2017, 2.57 million newborns died within the first 28 days of life and there were 2.6 million stillbirths preventable by acting on factors of risk [2] than Sauegain P. *et al.* (2016) are grouped around three axes, including: the state of maternal and child health; the supply of care in the department and its organizational dysfunctions as well as the consequences on her health of the poor socio-economic conditions of the pregnant woman [3]. Several studies in this field support this assertion, in particular those carried out by Chalumeau (2002) [4] and then Ntambue *et al.* (2013) [5]. Similarly, in 2017, the number of premature births amounted to 15 million (WHO, 2018) and several million children were born weighing less than 2500 grams.

Since the factors linked to perinatal morbidity and mortality are more exogenous than endogenous, they should be avoided by improving the care that mothers and newborns should receive before, during and immediately after childbirth (Akonkwa, 2012). In addition, the situation is more specific in the DRC following conflicts and crises that prevent pregnant women from receiving quality care. What remains at the base of the perpetuity of the anomalies around the pregnancy in the big agglomerations of the country? Knowing that the determinants of these extravagances are a function of the regions, it is then necessary to study their predictors according to the context in order to make informed decisions in the resolution of all these anomalies.

Thus, in order to contribute to the improvement of feto-infant life in the DRC, this study was initiated with the aim of determining the prevalence of perinatal morbidity and mortality and identifying the risk factors in the City Province of Kinshasa.

2. Material and Method

2.1. Study Environment

The study is carried out in the city province of Kinshasa, more precisely in two health zones drawn by lot in order to guarantee the random aspect of the participants. These are the Urban Health Zone of Matete and the Semi-Rural Health Zone of N^oSele located in the communes bearing their names.

2.2. Study Population

The study population is made up of women who have given birth followed in the health institutions of the study environment.

2.3. Method

We conducted a descriptive correlational cross-sectional study.

2.4. Sampling

We used cluster probability sampling. The sample size is determined by Fischer's formula which gave a sample size of 463 subjects.

2.5. Data Processing and Statistical Analysis

Data were entered in Microsoft Office Excel 2013 and then exported to SPSS 21 software for statistical analysis. The production of the frequency table and the cross tables as well as all the necessary statistics followed. The determination of risk factors for perinatal morbidity and mortality is made possible thanks to logistic regression at the significance level of 0.05.

2.6. Ethical Consideration

An authorization to conduct the study was given by the Academic General Secretariat of ISTM Kinshasa and the approval of the political and health authorities of the Matete and N'Sele Health Zones at the level of the Central Offices of these zones. In addition, a free and verbally informed consent was the starting point of the survey in addition to anonymity and confidentiality which were strictly observed.

3. Results

A sample size of 463 subjects was planned. After strict quality control, 456 records were deemed valid.

3.1. Descriptive Analysis

Table 1 shows that the frequency of perinatal morbidity and mortality in the City Province of Kinshasa is 13.8% for prematurity, 5.6% for low birth weight, 50.4 ‰ for perinatal mortality.

3.2. Multivariate Analyses: Logistic Regression

These results in **Table 2(a)** show that the risk factors for prematurity were: heavy work during gestation [OR = 11.6 (1.6 - 87.2); $p = 0.017$]; primigestia [OR = 4.2 (1.8 - 9.7); $p = 0.001$]; anterior prematurity [OR = 62.9 (25.9 - 152.8); $p = 0.000$] as well as the lack of vaccination against tetanus [OR = 4.0 (1.0 - 16.9); $p = 0.046$].

It emerges that the concept of prematurity [OR = 3.6 (1.7 - 7.6); $p = 0.001$] and the absence of tetanus vaccine [OR = 4.1 (1.2 - 14.1); $p = 0.023$] were the main risk factors for low birth weight. (**Table 2(b)**) However, early motherhood and then heavy work during pregnancy are almost at the limit p -value being respectively 0.057 and 0.055.

Table 2(c) shows four risk factors for perinatal mortality, namely: polygamy [OR = 5.2 (1.3 - 21.6); $p = 0.022$]; the concept of prematurity [OR = 3.4 (1.2 - 9.6); $p = 0.017$]; diseases (at least two) during gestation [OR = 8.9 (3.0 - 26.7); $p = 0.000$] as well as extra-hospital delivery [OR = 25.9 (1.4 - 477.7); $p = 0.029$].

Table 1. Frequency of perinatal morbidity and mortality.

No.	Indicators	Total births	Number of cases	Rate
01	Prematurity	456	63	13.8%
02	Low birth weight	393	22	5.6%
03	Perinatal mortality	456	23	50.4‰
	3.1. Stillbirths	456	16	35.1‰
	3.2. Early neonatal mortality	440	7	15.9‰

Table 2. (a) Risk factors for prematurity; (b) Risk factors for low birth weight; (c) Risk factors for perinatal mortality.

(a)

Risk factors for prematurity	OR	95% CI		Wald	sig.
		Lim<	Lim>		
Maternal age < 20 years	0.9	0.1	5.6	0.0	0.920
Celibacy	1.4	0.6	3.4	0.5	0.465
Polygamy	2.7	0.5	14.1	1.4	0.233
Low level of education	0.7	0.3	1.5	1.0	0.307
Promiscuity (≥5 person/household)	1.9	0.9	4.2	2.7	0.103
Heavy work during pregnancy	<u>11.6</u>	<u>1.6</u>	<u>87.2</u>	5.7	<u>0.017</u>
Late announcement of pregnancy	1.0	0.4	2.5	0.0	0.990
Primigestity	<u>4.2</u>	<u>1.8</u>	<u>9.7</u>	11.5	<u>0.001</u>
History of prematurity	<u>62.9</u>	<u>25.9</u>	<u>152.8</u>	83.7	<u>0.000</u>
Pathologies during pregnancy	1.7	0.8	3.7	1.8	0.175
Lack of tetanus vaccination	<u>4.2</u>	<u>1.0</u>	<u>16.9</u>	4.0	<u>0.046</u>
Out-of-hospital delivery	0.5	0.0	7.9	0.3	0.605
Constant	0.0			85.2	0.000

(b)

Low birth weight risk factors	OR	95% CI		Wald	sig.
		Lim<	Lim>		
Maternal age < 20 years	3.4	0.96	11.9	3.6	0.057
Celibacy	1.7	0.7	4.0	1.3	0.255
Polygamy	2.3	0.5	9.4	1.3	0.258
Low level of education	1.1	0.5	2.3	0.0	0.862
Promiscuity (≥5 person/household)	1.5	0.7	3.1	0.9	0.335
Heavy work during pregnancy	5.5	0.97	31.0	3.7	0.055
Late announcement of pregnancy	0.9	0.4	2.2	0.0	0.844
Primigestity	1.6	0.7	3.5	1.4	0.242
History of prematurity	<u>3.6</u>	<u>1.7</u>	<u>7.6</u>	10.9	<u>0.001</u>

Continued

Pathologies during pregnancy	0.8	0.4	1.9	0.2	0.668
Lack of tetanus vaccination	<u>4.1</u>	<u>1.2</u>	<u>14.1</u>	5.1	<u>0.023</u>
Out-of-hospital delivery	0.0	0.0	-	0.0	0.999
Constant	0.0			83.0	0.000

(c)

Risk factors for perinatal mortality	OR	95% CI		Wald	sig.
		Lim<	Lim>		
Maternal age < 20 years	1.6	0.2	13.0	0.2	0.648
Celibacy	2.4	0.7	8.1	1.8	0.176
Polygamy	<u>5.2</u>	<u>1.3</u>	<u>21.6</u>	5.2	<u>0.022</u>
Low level of education	2.7	0.9	7.6	3.4	0.064
Promiscuity (≥ 5 person/household)	1.7	0.6	5.2	1.0	0.314
Heavy work during pregnancy	1.6	0.1	17.3	0.1	0.702
Late announcement of pregnancy	1.6	0.5	4.8	0.7	0.410
Primigestity	0.6	0.2	1.9	0.7	0.407
History of prematurity	<u>3.4</u>	<u>1.2</u>	<u>9.6</u>	5.7	<u>0.017</u>
Pathologies during pregnancy	<u>8.9</u>	<u>3.0</u>	<u>26.7</u>	15.2	<u>0.000</u>
Lack of tetanus vaccination	2.1	0.3	13.6	0.6	0.445
Out-of-hospital delivery	<u>25.9</u>	<u>1.4</u>	<u>477.7</u>	4.8	<u>0.029</u>
Constant	0.0			63.0	0.000

The results in **Table 3** reveal an increase in the prevalence of perinatal morbidity and mortality according to the number of risk factors identified.

Table 3. Frequency of perinatal morbidity and mortality according to risk score.

Risk Score	Total births	Live births	Term births	Prematurity %	LBW %	PM ‰
0	165	165	163	1.2	3.1	0.0
1	180	173	168	6.7	6.5	38.9
2	88	80	54	38.6	7.4	90.9
≥ 3	23	15	8	47.8	25.0	347.8
Total	456	433	393			

4. Discussion

The aim of this study was to determine the prevalence and risk factors of perinatal morbidity and mortality in hospitals in the City Province from Kinshasa. Three indicators made it possible to carry out the study, namely prematurity, low birth weight and perinatal mortality.

4.1. Prematurity

The sample was made up of 456 mothers, 13.8% of whom had given birth before 9 months of gestation. Among the risk factors highlighted are: heavy work during gestation [OR = 11.6 (1.6 - 87.2); $p = 0.017$]; primigestia [OR = 4.2 (1.8 - 9.7); $p = 0.001$]; anterior prematurity [OR = 62.9 (25.9 - 152.8); $p = 0.000$] then lack of vaccination against tetanus [OR = 4.0 (1.0 - 16.9); $p = 0.046$].

These results corroborate those of Bréart G. *et al.* (1993) who had detected a prematurity rate of 12.3% in Benin. The existence of at least one serious pathology of pregnancy (hypertension, metrorrhagia, etc.), primigestity, celibacy, the existence of an unfavorable obstetrical history (ATCD of prematurity, FPN), accommodation in several people in a part were the main risk factors [6].

In Senegal, Ndiaye O. *et al.* (2005) had in a case-control study found an incidence of 30.9%. This preterm birth was due to multiparity, insufficient prenatal consultation (CPN) and pathologies during pregnancy [7].

The prematurity rate was 26.5% in Yaoundé, Cameroon. The factors associated with this phenomenon were: celibacy, lack of follow-up of the pregnancy, congenital malformation as well as pathologies of the pregnancy [8].

Unlike the previous author and our series, Ouattara A. *et al.* (2015) found in Ouagadougou a premature delivery rate of 6.1%. The risk factors were: maternal age ≥ 30 years, history of abortion and PROM, number of prenatal consultations less than 4 and pathology during pregnancy [9].

In a study conducted by Cartaux C. (2015) in France, the rate of prematurity was 7.4% and this was favored by early or late pregnancy, ethnic group, low weight gain during pregnancy, hard work, tobacco consumption, history of unfavorable outcome and pathologies during pregnancy (Vaginosis, uterine contractions) [10].

From all these results, we note that, whatever the country or region, the risk of preterm delivery remains present and varies according to time. This variation tends towards a regression in most African countries. All of the risk factors taken into consideration during the prenatal period remain poor socio-demographic, economic and cultural conditions, obstetric history and problems relating to the supply of care. Some of the differences observed internally are most likely related to the lifestyle and health policy of each country.

4.2. Low Birth Weight

After excluding pregnancies that had not reached 9 months, there remained 393 deliveries, including 22 children weighing less than 2500 grams at birth. This represents a prevalence of 5.6%.

In relation to this result, it should be noted that 58.5% had at least one risk factor. This was, after adjustment (logistic regression), for the history of prematurity [OR = 3.6 (1.7 - 7.6); $p = 0.001$] and the absence of tetanus vaccine [OR = 4.1 (1.2 - 14.1); $p = 0.023$].

We also note that the risk factors identified by the simple link test (Khi-square)

were, as in most of the studies carried out [6] [10] [11] [12] [13] [14]: celibacy, non-use of contraceptives, ignorance of the fertile period and the absence of vaccination against tetanus.

The result obtained by Blondel B. (1979) in France shows that the rate of low birth weight was 7.2% in 1976. Among the risk factors highlighted were: age below 18 years, celibacy, history of FPN, migrant woman, pathology during pregnancy [10].

Contrary to our results, in Benin, the low birth weight rate was assessed by Bréart G. *et al.* (1993) at 15.9%. Among the associated factors were: celibacy, ignorance of the DDR and the existence of at least one serious pregnancy pathology (HTA, PP) [6].

In Central Africa, studies made by the World Health Organization on low birth weight revealed an incidence of 14% in Gabon, 14% in the Central African Republic, 17% for Chad, and 11% in Cameroon (WHO, 2006) [15].

The prevalence of low birth weight in Brazzaville was estimated at 12.4% in 2007 (Mabiala JR. *et al.*, 2007). It was more frequent in postpartum women whose age was less than 18 years [11].

This rate was 2.19% between 2006 and 2007 in the Kingdom of Morocco (Amine M. *et al.*, 2009). The risk factors were: early pregnancy (before age 18), tobacco consumption, history of low birth weight, pathologies during pregnancy (hypertension, infection) and PMR [12].

In Cameroon, the prevalence of low birth weight was 20.8% in 2004 and fell to 13.1% 4 years later (Miaffo L., 2009) [13]. Regarding risk factors, early pregnancy was among those identified by the researcher [13].

For his part, Padonou R. (2014) found that the prevalence of FPN was 9.1%. The majority of children born with this low weight had experienced intrauterine growth retardation. To this was added primiparity. The effect of anemia and malaria during pregnancy were not associated [14].

Certainly! There are some similarities and discrepancies between these results and ours. Between countries, this would be explained by the way of life and the health policy of each and over time, the contributions and research aimed at improving the quality of care remain the basis of these regressions in the figures.

4.3. Perinatal Mortality

The perinatal mortality rate was 50.4‰ with 35.1‰ of stillbirths and 15.9‰ of early neonatal mortality. We observe that this rate is also a function of the number of risk factors obtained by the logistic regression, including: polygamy [OR = 5.2 (1.3 - 21.6)]; the notion of prematurity [OR = 3.4 (1.2 - 9.6)]; diseases during gestation [OR = 8.9 (3.0 - 26.7)] as well as extra-hospital delivery [OR = 25.9 (1.4 - 477.7)].

In several studies as described below, the existence of either of these factors leads to early foeto-neonatal death [6] [16] [17] [18].

UNDP (2007), revealed that in the DRC the situation is not really changing because the infant mortality rate in general was 73 per thousand in 2007 with

more than 50% in the perinatal period. In 2012, this rate was 43.9‰ in the city of Bukavu [17].

Furthermore, the surveys by Bréard G. *et al.* (1993) showed that perinatal mortality was 95‰ in the Republic of Benin [6].

In Mali, the frequency of perinatal mortality was 61.6‰ births; stillbirths estimated at 44.93‰ births and early neonatal mortality at 17.44‰ births in 2006 [19], and, increased to 128.3‰ according to a study conducted by Aissata D. (2008). Stillbirth and early neonatal mortality were respectively evaluated at 96.3‰ and 36.7‰. The main associated factors were: age below 18 years, heavy physical work, late PNC, the existence of pathology during pregnancy (hypertension, abnormal uterine contraction) and the history of prematurity [20].

For his part, Nguyen NT *et al.* (2008) found the PM rate to be 21.4‰, stillbirth 12.5‰ and early neonatal mortality rate 9.0 per 1000 live births.

In 2009, Crépin G. & coll. (2010) had recorded a stillbirth rate of 11.9‰ and that of early neonatal mortality of 1.7‰ in France [19].

Bréart G. *et al.* (1993) had identified 14 risk factors grouped into three clusters: biological (demographic), medical (history) and social (cultural and/or economic) factors [6]. This is supported by Nzita K. (1985) who concluded that the risk factors observed in perinatal health are physiological, socio-economic or behavioral [18].

Among the risk factors found by Kangulu *et al.* (2014) [21] was a low level of education which was explained by ignorance of many elements necessary for the prevention of perinatal mortality.

4.4. Risk Score

Table 3 presents a score ranging from 0 to 3 and more. The modal class for said score was the one with score 1 (180 observations out of the 456 or 39.5%).

In connection with the unfavorable outcomes in the Republic of Benin, Bréart G. *et al.* (1993) had found that the number of risk factors presented by the female population for this effect was not less than 4 and the majority was observed in the class whose score was equal to 1 (27.96%) [6].

This shows that the number of risk factors to which the pregnant woman is exposed also influences the occurrence of an anomaly during pregnancy and more particularly during the perinatal period.

5. Conclusions

The prevalence of perinatal morbidity and mortality in the City Province of Kinshasa is high. Any action oriented towards its reduction must emphasize the improvement of the socio-demographic, cultural and economic conditions of women of childbearing age, the provision of quality care to pregnant women and good care for them and their babies.

It would also be desirable to carry out similar larger studies for a broad reflection of this scourge throughout the City and the country as far as possible.

Authors' Contributions

All authors contributed to the realization of the study. They have read and accepted the published version of the manuscript.

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Conflicts of Interest

The authors declare that they have no conflict of interest.

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