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Analysis of Factors Influencing Maternal and Fetal Prognosis during Childbirth at a Community Medical Center in Conakry, Guinea: Case of the Bernard Kouchner Municipal Medical Center in Coronthie

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Abstract

In Africa, poor quality of care is often a major factor influencing maternal and perinatal outcomes. The objective of this study was to investigate the factors that negatively influence maternal and fetal prognosis during childbirth. **Methods**: The study was conducted at the Coronthie Community Medical Center. It was a cross-sectional, descriptive, and analytical study conducted from July to December 2021. Women in labor who were ≥28 weeks pregnant and who agreed to participate in the study were included. Those excluded were women who were evacuated before giving birth and those who refused to participate. Verbal consent was obtained from the patients. **Results:** The proportion of quality deliveries was 36.7%. The average age of the women in labor was 28.60 years. Most of the women who gave birth were professionals with a secondary education. Nearly half (45.4%) had given birth by Cesarean section, and 25.1% had developed complications. In addition, the study showed that the risk of developing maternal complications is doubled in women who have given birth by caesarean section (P = 0.026; OR-IC = 1.97 [1.13 - 3.29]). Perinatal mortality was 149/1000 live births. **Conclusion:** Proper management of factors that negatively influence childbirth could improve maternal and neonatal prognosis.

Keywords

Childbirth, Influencing Factors, Maternal and Fetal Prognosis

1. Introduction

Childbirth is the set of physiological and mechanical phenomena that result in the expulsion of the fetus and its appendages from the maternal genital tract, once the pregnancy has reached the theoretical term of 22 weeks of gestation [1]. It is a normal physiological process that can occur without complications for the majority of women and children [2]. One of the factors that positively influences the prognosis is receiving skilled birth attendance, which is the process by which a woman receives adequate care during labor, delivery, and the postpartum period. Thus, over a 10-year period, there has been a 12% increase in assisted births worldwide [3]. In Guinea, the same observation has been made, with free healthcare being one of the contributing factors. There is a significant difference in maternal mortality between developed countries and low-income countries. On average, there were 13 deaths per 100,000 live births in Europe in 2017, compared to 390 per 100,000 live births in sub-Saharan Africa [4]. This estimate for Africa is five times higher than the SDG target set for 2030, which is to reduce the global maternal mortality ratio to below 70 deaths per 100,000 live births. Sub-Saharan Africa and South Asia account for approximately 86% of estimated maternal deaths worldwide in 2017 [4]. Maternal mortality was 373/100,000 live births in Mali and 550/100,000 live births in Guinea (EDSM-VI 2018) [5] [6]. The maternal mortality ratio is the health indicator for which the disparity between industrialized and developing countries is greatest. In 2017, the maternal mortality rate in the least developed countries was still high. It is estimated at 415 (CI = [396; 477]) maternal deaths per 100,000 live births, which is more than 40 times higher than the maternal mortality rate in Europe (10; CI = [9; 11]), and nearly 60 times higher than that of Australia and New Zealand [7]. Socioeconomic factors play an important role in this imbalance, but deficiencies in maternal health services are directly responsible for the majority of deaths. The dysfunctions identified were:

-Insufficient qualified personnel;

-Poor management of those who are qualified;

-Poor allocation of scarce resources;

-Poor relations between health personnel and pregnant women, and

-Shortages of equipment, medicines, and blood.

These shortcomings are responsible for poor quality maternal care. Implementing the measures recommended as part of the Safe Motherhood Initiative would significantly reduce maternal and neonatal deaths. These measures include the prevention and management of unwanted pregnancies and unsafe abortions, the provision of skilled care during pregnancy and childbirth, and access to specialized care in the event of complications [7].

Our objectives in conducting this research were to determine the proportion of quality deliveries performed in the department, describe the sociodemographic characteristics of women in labor, and identify factors that influence maternal and fetal prognosis.

2. Methods

The study was conducted in the Gynaecology-Obstetrics Department of the Coronthie Communal Medical Centre, which is a Level II referral hospital in Guinea's healthcare system. It was a quantitative, descriptive and analytical study lasting six months, from 1 July to 31 December 2021.

2.1. Selection Criteria

Inclusion criteria: All women admitted to the delivery room who were ≥28 weeks pregnant and agreed to participate in the study were included.

Exclusion criteria: Women referred/transferred to other departments before delivery or those who refused to participate in the study.

2.2. Data Collection

Data was collected through observation and individual interviews, using a questionnaire. This data was supplemented by patients' obstetric records, delivery registers and surgical reports. Any birth occurring in a healthcare facility, performed by qualified personnel in accordance with standards associated with a good maternal and neonatal prognosis, was considered a quality delivery.

2.3. Sample Size

This was calculated using the Lorenz formula: $N = Z\alpha 2PQ/e^2$ (where: N = minimum sample size; $Z\alpha$ = normal distribution value = 1.96 for e = 0.05;

P = prevalence of delivery in the department = 29.7%; Q = 1 − P; e = precision level = 5%). This gave us a minimum sample size of 321 women in labour.

NB: The minimum sample size of 321 parturients is the number below which the study is not valid. However, we would like to point out that it is possible to exceed the minimum sample size, even doubling or tripling it, which is why we continued collecting data until we had 459 cases.

Analysis and presentation of results: data were entered and analysed using EPI INFO software version 6. The data were then transferred to SPSS 21.0 software for analysis.

2.4. Statistical Test

The chi^2 test was used with a significance threshold set at $P < 0.05$. The results were presented in the form of single and double-varied tables and figures. In addition, we calculated the mean, odds ratio and confidence interval.

2.5. Analysis and Presentation of Results

Data were entered and analyzed using EPI INFO software version 6. The data were then transferred to SPSS 21.0 software for analysis.

Statistical test: The chi^2 test was used with a significance threshold set at $P < 0.05$. The results were presented in the form of single and double-variate tables and figures. In addition, we calculated the mean, odds ratio, and confidence interval.

2.6. Ethical Considerations

Before conducting the study, we obtained approval from the administrative authorities of the department, the patients gave their verbal consent before participating in the study, confidentiality was respected throughout the data collection process, and the results were used strictly for scientific purposes.

3. Results

3.1. Frequency

Text: Proportion of quality deliveries: Of the 469 deliveries recorded, including 10 twin pregnancies, we observed 172 quality deliveries, representing a proportion of 36.7%.

3.2. Sociodemographic Profile of Women in Labor

Table 1. Sociodemographic characteristics of women in labor.

Sociodemographic variables	Number of respondents (N = 459)	Percentage (%)
Age group		
≤20	74	16.1
20 - 25	126	27.4
25 - 30	155	33.8
30 - 35	73	15.9
35 - 40	30	6.5
Average age: 28.6 ± 5.4 years	Extremes: 15 and 42 years	
Marital status		
Single	45	9.8
Divorced/Widowed	2	0.4
Married	412	89.8
Level of education		
Not in school	81	17.6
Elementary school	59	12.8
High school	161	35.1
Higher education	158	34.4
Occupation		
Students	135	29.4
Employees	88	19.2
Self-employed (dependent)	147	32.0
Housewives	89	19.4

The average age of our patients was 28.6 years, ranging from 15 to 42 years. The most represented age group was 25 - 30 years, accounting for 33.8% of cases, followed by 20 - 25 years, accounting for 27.4% of cases. Almost all of the women giving birth (89.8%) were married. Most of our patients had either a secondary or higher education level, with respective proportions of 35.1% and 34.4%. Nearly one-third (32%) of our patients were self-employed (Table 1).

3.3. Obstetric Characteristics

Table 2. Distribution of patients according to parity.

Parity	Workforce	Percentage (%)
Nulliparous	1	0.2
Primiparous	168	36.6
Pauciparous	201	43.8
Multiparous	73	15.9
Highly multiparous	16	3.5
Total	459	100

Most of our patients were multiparous and primiparous women, with respective frequencies of 43.8% and 36.6% (Table 2).

3.4. Factors Influencing Maternal and Fetal Outcomes

3.4.1. Maternal Morbidity and Mortality and Influencing Factors

Table 3. Type of maternal morbidity.

Maternal morbidity	Workforce	Percentage
Perineal trauma	73	16
Postpartum hemorrhage	22	4.8
Parietal suppuration	1	0.2
Uterine rupture	1	0.2
Bladder detachment	361	78.6
Total	459	100

For the analysis of complications, a single morbidity was considered per woman. Overall, the outcome was favorable in the majority of patients after delivery. A morbidity rate of 25.1% was recorded among women who had given birth. Among these complications, the most common were perineal trauma (16%) and postpartum hemorrhage (4.8%) (Table 3).

To ensure adequate protection during pregnancy and reduce the risks associated with childbirth, particular emphasis should be placed on prenatal consultations, but medical staff must also provide high-quality consultations that include a birth plan. Above all, medical staff must rely on the latest prenatal consultations,

which are ideal opportunities for screening for risk factors associated with childbirth. This enables staff to take appropriate measures during childbirth. In our study, we found that more than half of those surveyed had had fewer prenatal consultations than recommended by the country's national policy, which is to have at least four prenatal consultations during pregnancy. However, we found that 4.8% of women in labor had not had any prenatal consultations. We also found that the risk of maternal death increases twofold among women who have not had prenatal consultations (OR-IC = 1.87 [1.71 - 4.75], P = 0.006). In fact, among the six maternal deaths we recorded, five of the women had not had any prenatal consultations (Table 4).

Table 4. Prenatal consultations and risk of maternal mortality.

Number of prenatal consultations	Maternal death		Percentage (%)
	No	Yes	
No prenatal consultations	17 (3.7)	5 (83.3)	22 (4.8)
1 - 3	301 (66.4)	1 (16.7)	302 (65.8)
≥4	135 (29.8)	0	135 (29.4)
Total	453 (100)	6 (100)	459 (100)

Average prenatal consultations = 3.24 ± 1; Extremes = 1 and 5 prenatal consultations, P = 0.006; OR-CI = 1.87 [1.71 - 4.75].

Table 5. Relationship between mode of delivery and risk of maternal complications.

Complications	Mode of delivery N = 469		Total
	Vaginal delivery	Cesarean section	
No	202 (78.9)	149 (69.9)	351 (74.9)
Yes	54 (21.1)	64 (30.1)	118 (25.1)
Total	256 (54.6)	213 (45.4)	469 (100)

P = 0.026; OR-CI = 1.97 [1.13 - 3.29].

NB: there were 2.2% twin pregnancies, either 10 more births (N = 469). Here too, the sample size changes to 469, with 10 twin births recorded.

Analysis of the results showed that 25.1% of women who had given birth developed complications, and most of them had given birth by cesarean section. Thus, the risk of developing complications after delivery is doubled in women who have given birth by cesarean section (P = 0.026; OR-CI = 1.97 [1.13 - 3.29]) (Table 5).

Most of our parturients (54.6%) gave birth vaginally, and a significant proportion (45.4%) gave birth by cesarean section. This proportion of cesarean sections is above the national average and is justified by the fact that our department is a referral service for the municipality's basic health facilities. It should be noted that six cases, or 1.3% of women in labor, died following childbirth. Among them, five, or 83.3%, had given birth by cesarean section. We found a statistically significant

link between the mode of delivery and maternal death. Cesarean sections increase the risk of maternal mortality by a factor of two compared to vaginal delivery (P = 0.003; OR-CI = 1.82 [1.79 - 2.92]) (Table 6).

Table 6. Relationship between mode of delivery and risk of maternal death.

Mode of delivery	Maternal death		Total
	No	Yes	
Vaginal delivery	255 (55.1)	1 (16.7)	256 (54.6)
Cesarean section	208 (44.9)	5 (83.3)	213(45.4)
Total	463 (98.7)	6 (1.3)	469 (100)

P = 0.003; OR-IC = 1.82 [1.79 - 2.92].

We did not perform a multivariate analysis with logistic regression during this study, so we cannot say with certainty whether this risk is inherent to the surgical procedure or whether it results from pre-existing complications.

3.4.2. Perinatal Morbidity and Mortality and Influencing Factors

Table 7. Neonatal morbidity.

Neonatal morbidity	Workforce N = 469	Percentage
Hypotrophy	72	15.4
Neonatal asphyxia	32	6.8
Prematurity	28	5.9
Macrosomia	26	5.5
Malformation	3	0.6
Hypoglycemia	2	0.4

Overall, the majority of newborns showed favorable progress after delivery. However, some newborns were hypotrophic (15.4%), others had experienced neonatal asphyxia (6.8%), and 5.9% were premature. Other morbidities included macrosomia (5.5%), malformations (0.6%), and hypoglycemia (0.4%) (Table 7).

Table 8. Relationship between mode of delivery and perinatal mortality.

Mode of delivery	Status of newborns N = 469		Total
	Deceased	Living	
Cesarean section	33 (47.1)	180 (45.1)	213 (45.4)
Vaginal delivery	37 (52.9)	219 (54.9)	256 (54.6)
Total	70 (14.9)	399 (85.1)	469 (100)

P < 0.0001; OR-IC = 2.58 [1.61 - 4.03].

Most newborns (85.1%) were alive at birth. However, we recorded 70 cases of perinatal deaths, or 14.9%. A predominance of perinatal deaths was observed among patients who gave birth vaginally. This could be explained by antepartum deaths, which often benefit from vaginal delivery. Thus, the risk of perinatal mortality is three (3) times higher in women who gave birth vaginally (P < 0.0001; OR-CI = 2.58 [1.61 - 4.03]) (Table 8).

Table 9. Relationship between birth weight and fetal lethality.

Birth weight in grams	Status of the newborn		Total
	Deceased	Living	
<2500	32 (45.8)	40 (10.0)	72 (15.4)
2500 - 3999	23 (32.8)	348 (87.2)	371 (79.1)
Pus 4000	15 (21.4)	11 (2.8)	26 (5.5)
Total	70 (14.9)	399 (85.1)	469 (100)

P = 0.0014; OR-IC = 3.39 [1.76 - 17.50], NB: We recorded 2.2% twin pregnancies.

It was found that (15.4%) of newborns had a low birth weight (<2500 g) and 5.5% were macrosomic (≥4000 g). However, the vast majority of newborns (79.1%) had a normal birth weight (2500 - 4000 g). Perinatal mortality was 14.9%. We also found that 45.8% of newborns who died had low birth weight. Thus, the risk of perinatal mortality is three times higher in newborns with low birth weight (P = 0.0014, OR-IC = 3.39 [1.76 - 17.5]) (Table 9).

Table 10. Causes of perinatal deaths.

Cause of death	Workforce	Percentage
Neonatal asphyxia	22	4.6
Prematurity	18	3.8
Hetroplacental hematoma	14	2.9
Malformation	3	0.6
Ruptured uterus	1	0.2

The results showed that the main cause of perinatal deaths was acute neonatal asphyxia, accounting for 4.6%. The other perinatal deaths had various causes: retroplacental hematoma (3.8%), fetal malformations, and uterine rupture. These fetal malformations were hydrocephalus, spina bifida, and omphalocele (Table 10).

4. Discussion

Text 1: Proportion of quality deliveries.

Our proportion of quality deliveries, at 36.7%, is identical to the 33% reported by HATEM.M *et al.* in 2018 at the National I Deen Hospital [8].

4.1. Sociodemographic Characteristics

Age: The average age of our patients, which was 28.6 years, is lower than the average age of 30 found in Guadeloupe in 2013 by Butoria J B *et al.* [9]. This average age in this series can be explained by the fact that it corresponds to a period of peak genital activity regardless of the country.

4.1.1. Marital Status

Almost all of the women in labor (89.8%) were married. This proportion of married women is higher than that reported by Achille A A O *et al.* in Benin, who reported that 48% of women in labor in their sample were married [10]. This could be explained by the socio-cultural and religious requirements of our context, which do not easily accept conception outside of marriage, and by the fact that marriage constitutes the legal framework for procreation.

4.1.2. Level of Education

Most of our patients had a secondary level of education, although a global WHO survey showed that birth rates were inversely proportional to women's level of education. Women with no education have on average twice as many children as those who have had seven or more years of schooling [11].

4.1.3. Occupation

Nearly one-third (32%) of our patients were self-employed professionals without a monthly salary. More and more women are seeking income-generating activities in order to be less dependent on their spouses or families.

4.2. Obstetric Characteristics

Parity: nearly half (43.8%) of the patients in this sample had had few children. This finding is identical to that of Diémé F. M.E. *et al.* in Senegal in 2015, who reported that women who had had few children were in the majority in their sample. They reported a proportion of 73.7% of women who had given birth to few children [12]. This high proportion of women who had given birth to few children in this study could be explained by the young age of the patients at marriage, unmet family planning needs, and the pro-natalist attitude advocated by their spouses [13].

4.3. Factors Influencing Maternal and Fetal Prognosis

4.3.1. Type of Maternal Morbidity

The frequency of maternal morbidity was 25.1%. The most common were perineal trauma (16%) and postpartum hemorrhage (4.8%). Our complication rate of 21.4% is lower than the 41.5% reported by Foumsou L *et al.* in Chad in 2017, with a predominance of postpartum hemorrhage in 20.7% of cases, followed by cervical laceration in 9.4% of cases [14].

4.3.2. Mode of Delivery and Maternal Morbidity

The majority of patients did not develop complications during delivery. However,

25.1% of women who gave birth did experience complications. Depending on the mode of delivery, more complications were observed in the cesarean section group than in the vaginal delivery group. The difference was statistically significant (P = 0.026; OR-CI = 1.97 [1.13 - 3.29]).

4.3.3. Maternal Mortality

Prenatal consultations and risk of maternal death: To ensure adequate protection during pregnancy and reduce the risks associated with childbirth, particular emphasis should be placed on prenatal consultations, but medical staff must also provide high-quality consultations that include a birth plan. Medical staff should rely primarily on the last prenatal consultations, which are ideal opportunities for screening for risk factors related to childbirth. This allows staff to take appropriate measures during childbirth. In our study, we found that more than half of the respondents had had fewer prenatal consultations than recommended by the country's national policy, which is to have at least four prenatal consultations during pregnancy. However, we found that 4.8% of women in labor had not had any prenatal consultations. We also found that the risk of maternal death increases twofold among women who have not had prenatal consultations. In fact, among the six maternal deaths we recorded, five of them had not had any prenatal consultations, which doubles the risk of maternal death among patients who have not had prenatal consultations (OR-IC = 1.87 [1.71 - 4.75], P = 0.006).

4.3.4. Mode of Delivery and Maternal Deaths

Most of our parturients (54.6%) had given birth vaginally, while a significant proportion (45.4%) had given birth by cesarean section. This proportion of cesarean sections is above the national average, which is justified by the fact that our department is a referral service for basic health facilities in the municipality. We recorded six cases of maternal mortality, or 1.3%. Among these women who died, five, or 83.3%, had given birth by cesarean section. We found a statistically significant link between the mode of delivery and maternal death. Cesarean section increases the risk of maternal mortality by a factor of 2 compared to vaginal delivery (P = 0.003; OR-CI = 1.82 [1.79 - 2.92]).

4.3.5. Neonatal Mortality

The results showed that the main cause of perinatal deaths was acute neonatal asphyxia, accounting for 4.6%. The other perinatal deaths had various causes: retroplacental hematoma (3.8%), fetal malformations, and uterine rupture. These fetal malformations were hydrocephalus, spina bifida, and omphalocele. Our perinatal mortality rate of 14.9% is close to the 18.20% found in Lumumbashi, Ntambue A.M. *et al.* These rates are higher than the data in the literature, which could be explained by the fact that these studies were conducted in referral health facilities. This perinatal mortality rate does not reflect the national data for these countries. In the bivariate analysis, it was found that the risk of perinatal mortality is three (3) times higher in women who gave birth vaginally (P < 0.0001; OR-IC = 2.58 [1.6 - 4.03]). In a study conducted in several countries in West and Central

Africa, Pruel. A *et al.* report neonatal mortality rates that vary greatly from one country to another. Thus, we note 12‰ nv (MDG already achieved) in Cape Verde, 21‰ nv in Senegal, and 34‰ nv in Nigeria [15]. The influence of this quality of care can be seen when comparing the perinatal mortality rate in developed countries, which is <10/1000 live births, with 27‰ live births in Lumumbashi and 87‰ in Kinshasa in 2019 [16].

4.3.6. Perinatal Mortality and Birth Weight

It was found that 15.4% of newborns had a low birth weight (<2500 g) and 5.5% were macrosomic (≥4000 g). However, the vast majority of newborns (79.1%) had a normal birth weight (2500 - 4000 g). Perinatal mortality was 14.9%. We also found that 45.8% of newborns who died had low birth weight. Thus, the risk of perinatal mortality is three times higher in newborns with low birth weight (P = 0.0014, OR-IC = 3.39 [1.76 - 17.5]). In a study conducted in Lausanne (Switzerland), Cetinkaya SE *et al.* identified low birth weight as a factor increasing the risk of perinatal mortality in their multivariate regression analysis [17].

4.3.7. Causes of Neonatal Death

The results of the study showed that the main causes of perinatal deaths were acute neonatal asphyxia (4.6%), prematurity (3.9%), and retroplacental hematoma (3.8%). Foumsou L *et al.* in Chad in 2017 reported that the main causes of neonatal deaths were respiratory distress (2.3%) and prematurity (1.9%) [14]. In a meta-analysis, Joy E Lawn *et al.* found that the main causes of perinatal deaths were low birth weight and prematurity [18].

5. Conclusion

It was found that the proportion of high-quality deliveries was low in the department. The sociodemographic characteristics were dominated by the young age of the women in labor and their low level of education. Most were self-employed. Nearly half had given birth by cesarean section, and the risk of developing maternal complications was doubled in women who had given birth by cesarean section (P = 0.026; OR-IC = 1.97 [1.13 - 3.29]). The prognosis was dominated by high maternal morbidity and very high perinatal mortality. The factors influencing the risk of perinatal morbidity and mortality were: poor quality prenatal care, cesarean delivery, low birth weight, and acute neonatal asphyxia. To reduce the risks associated with these influencing factors, it is necessary to provide high-quality prenatal consultations, rigorous monitoring of labor, and good perinatal care.

Author Contributions

Sow Ibrahima Sory: Conceptualization, Formal Analysis, Methodology, Writing—original draft.

Boubacar Alpha Diallo: Conceptualization, Funding acquisition, Resources, Writing—original draft.

Oumou Hawa Bah: Data curation, Investigation.

Ibrahima Conte: Project administration, Writing—original draft.
LENO Daniel W; Telly SY: Supervision, Validation.

Conflicts of Interest

There are no conflicts of interest in the completion of this work.

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