

Frequency and Risk Factors of Neonatal Macrosomia at Labe Regional Hospital in Guinea

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Abstract

Macrosomia is defined as a term birth weight greater than or equal to 4000 grams, or greater than the 90 percentile of intrauterine growth curves. Excessive weight has harmful consequences for the newborn and is a major health concern. **Objectives:** To determine the frequency of neonatal macrosomia, describe risk factors and neonatal and maternal complications. **Materials and methods:** This was a cross-sectional study carried out between January and December 2022, involving newborns whose birth weight was greater than or equal to 4000 grams admitted to the neonatology unit of the Labe regional hospital. **Results:** 591 deliveries were recorded, 15 of which were macrosomic, representing a frequency of 2.54%. The average age of the women was 30.26 years. History of fetal macrosomia and diabetes was 93.33 and 71.43% respectively. The mean gestational age was 38.71 ± 0.75 SA, the mean antenatal consultation was 3 ± 0.8 and the mode of delivery was caesarean section (66.67%). Third-trimester ultrasound was performed in 53.33% of cases. Macrosomic newborns were male in 80% of cases. Neonatal complications were asphyxia (60%), hypoglycemia (20%) and hypocalcemia (13.33%). Factors associated with neonatal macrosomia were diabetes ($P < 0.001$), history of macrosomia ($P < 0.001$) and maternal obesity ($P < 0.001$). **Conclusion:** this study shows that the frequency of neonatal macrosomia is 2.54% with high neonatal morbidity among newborns hospitalized in the neonatology unit of the Labé regional hospital. Screening for macrosomia risk factors

during pregnancy is essential to prevent perinatal complications.

Keywords

Frequency, Macrosomia, Labe

1. Introduction

Birth weight is an indicator of normal newborn development. Low birthweight and macrosomia are important determinants of infant survival at birth [1].

Macrosomia is defined as a birth weight at term greater than or equal to 4000 grams, or greater than the 90 percentile of intrauterine growth curves [2]. Excessive weight has harmful consequences for the newborn and is a major health concern [1].

The prevalence of macrosomia varies from region to region [3] [4] due to differences in contributing risk factors [5]. The rising prevalence of diabetes and obesity among women of childbearing age may be associated with an increase in the birth of macrosomic children [1].

In developed countries, macrosomia accounts for between 5% and 20% of all births [6]. Macrosomic newborns are at risk of obstetric trauma [7], as well as neonatal hypoglycemia and hypocalcemia [8]. Mothers are at risk of caesarean delivery [9] and anal sphincter damage [10]. Management of obesity and hyperglycemia during pregnancy is essential to prevent neonatal macrosomia [11].

In developing countries, research on macrosomia shows variable prevalences ranging from 5% to 16% [12].

The risk of maternal and fetal complications is high due to the lack of basic health care in these regions [7].

We therefore carried out a descriptive cross-sectional study to determine the frequency of neonatal macrosomia and to describe the risk factors and neonatal and maternal complications in the neonatology unit of the Labe regional hospital in Guinea.

2. Methodology

This was a descriptive cross-sectional study carried out at the Neonatology Unit of the Labé Regional Hospital between January 01 and December 31, 2022. We collected data on newborns with a birth weight \geq 4000 grams admitted to hospital for respiratory distress or hypotonia. This was an exhaustive sample meeting the inclusion criteria.

Data collection was based on medical records and the hospitalization register. Epidemiological characteristics of mothers and newborns were collected: mothers' age, place of residence, occupation, personal history of macrosomia, diabetes, hypertension, obesity and gestational age, pregnancy follow-up, number of prenatal consultations, number of obstetric ultrasounds and sex of newborns.

Clinical characteristics included mode of delivery, birth weight, height, neonatal and maternal complications and capillary blood glucose. Biological tests performed on admission included blood ionogram and complete blood count. Therapeutic management and maternal-fetal prognosis were also collected. Data entry and statistical analysis were performed using Epi-Info version 7.2.2.6. The Chi-2 test was used to study associated risk factors, and the significance level was set at 5%.

3. Results

Epidemiological Characteristics of Mothers

During the study period, 591 deliveries were recorded, 15 of which were macrosomic, *i.e.* a frequency of 2.54%. The average age of the women was 30.26 ± 4.69 years. Housewives accounted for 66.66% and lived in rural areas in 60% of cases. Fetal macrosomia and diabetes were predominant in 93.33% and 71.43% of cases respectively. These data are collated in **Table 1**.

Clinical characteristics

The mean gestational age in our series was 38.71 ± 0.75 ; the mean antenatal visit was 3 ± 0.81 ; the mode of delivery was caesarean section in 66.67% of cases. 53.33% of parturients had undergone ultrasound in the 3rd trimester.

Males predominated in our series, in 80% of cases. Macrosomic newborns had a birth weight of between 4000 and 4300 g in 93.33%, and in 6.67% the birth weight was between 4301 and 4500 grams.

Table 1. Epidemiological characteristics of mothers.

| Characteristics | Workforce | % |
|---------------------|----------------------------|-------|
| Mean age | 30.26 ± 4.69 [19 - 36] | |
| Place of residence | | |
| Urban | 6 | 40.00 |
| Rural | 9 | 60.00 |
| Profession | | |
| Student | 1 | 6.67 |
| Housewife | 10 | 66.66 |
| Accountant | 1 | 6.67 |
| Merchant | 3 | 20.00 |
| Past history | | |
| Diabetes | 5 | 71.43 |
| Macrosomia | 14 | 93.33 |
| HTA | 3 | 20.00 |
| Obesity | 3 | 20.00 |
| Average parity | 4.400 ± 1.59 | |
| Average Gestite | 4.400 ± 1.59 | |

Neonatal complications were asphyxia (60%), hypoglycemia (20%) and hypocalcemia in 13.33% of cases. These data are presented in **Figure 1**.

Factors associated with neonatal macrosomia were diabetes ($P < 0.001$), history of macrosomia ($P < 0.001$) and maternal obesity ($P < 0.001$). These data are presented in **Table 2**.

4. Discussion

We conducted a study of macrosomic newborns admitted to the neonatology unit of the Labé regional hospital in Guinea.

Of a total of 591 newborns admitted during the study period, 15 were macrosomic, representing a frequency of 2.54%. The frequency of macrosomia found in our work was close to that reported in certain African studies, varying between 1.57% and 3.85% [12]. In developed countries, the frequency of neonatal macrosomia varied between 5% and 20%, with an increase of 15% - 25% noted over the last three decades [13]. The average weight of macrosomic newborns was $4100 \text{ g} \pm 219.6816$. Data in the literature support the view that maternal and neonatal morbidity increases with birth weight, especially in newborns weighing over 4500 g [14]. The average age of the women in our series was 30 ± 4.7 years. Indeed, advanced maternal age has been described as a risk factor for neonatal macrosomia [15]. Male sex was predominant in 80% of cases. The predominance of males is indisputable, and several studies report rates in excess of 60% of cases [16]. All authors agree that male newborns generally weigh more than female newborns at all gestational ages [17].

The factors associated with neonatal macrosomia in our study were diabetes ($P < 0.001$), history of macrosomia ($P < 0.001$) and maternal obesity ($P < 0.001$),

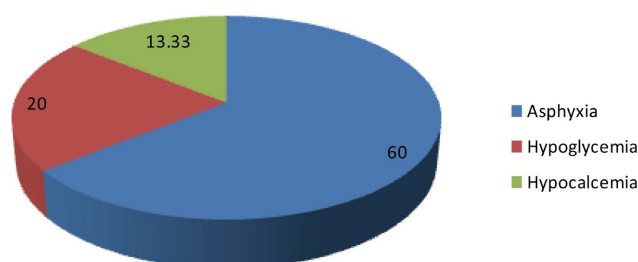


Figure 1. Distribution of patients according to complications of macrosomia.

Table 2. Distribution of parturients according to factors associated with neonatal macrosomia.

| Associated factors | Workforce | % | P |
|--------------------|-----------|-------|-------------|
| Maternal history | | | |
| -Diabetes | 5 | 71.43 | $P < 0.001$ |
| -Macrosomia | 14 | 93.33 | $P < 0.001$ |
| -Obesity | 3 | 20.00 | $P < 0.001$ |

with statistically significant differences. The results found in our series concur with those reported by Prosper Kakudji Luhete *et al.* [18]. Diabetes and obesity, identified as risk factors associated with macrosomia in our study, were found by several authors [16] [19] [20]. This could be explained by the interdependent mechanism of carbohydrate and lipid metabolism, which would be responsible for fetal hyperinsulinism in response to maternal hyperglycemia [18]. Insulin, an anabolic hormone, draws carbohydrates into cells, accumulates fatty acids in adipose tissue and proteins in muscle, leading to fetal macrosomia [18] [21]. A history of macrosomia was also found in some studies [18] [21] [22]. Hyperglycemic states are literally associated with increased newborn weight [23].

Neonatal complications were dominated by neonatal asphyxia (60%), hypoglycemia (20%) and hypocalcemia (13%).

The results of our study concur with those found by AichaSalim Said and Karim PremjiManji [24], who reported 22.7% of cases of hypoglycemia, 14.4% of cases of asphyxia and 1% of cases of hypocalcemia. The delivery of a macrosomic baby is associated with well-known maternal and neonatal complications: shoulder dystocia with, in rare cases, brachial plexus elongation, asphyxia during expulsion, fractures (clavicle and humerus) during maneuvers, and neonatal hypoglycemia and hypocalcemia [17]. No maternal complications were identified in our series. The limitation of our study was related to the insufficiency of maternal data and the duration of the study.

5. Conclusion

This study shows that the frequency of neonatal macrosomia is 2.54% with high neonatal morbidity among newborns hospitalized in the neonatology unit of the Labé regional hospital. Screening for macrosomia risk factors during pregnancy is essential to prevent perinatal complications.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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