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Perinatal Anoxia: Clinical Aspects and Prognosis at the Commune II Reference Health Centre in Bamako, Mali

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Abstract **Original Research Article**

Reducing neonatal morbidity and mortality linked to anoxia is a real problem for neonatology units in Mali's health districts. Perinatal anoxia is the main cause of early death in Commune II. The aim of our study was to describe the clinical characteristics and immediate outcome of perinatal anoxia and the factors associated with neonatal mortality in this condition. Materials and methods: We conducted a retrospective cross-sectional study from 1 May 2022 to 30 April 2023 in the paediatric department of the Bamako commune II referral health centre. It concerned all births with anoxia in the commune. Results: Out of 2224 newborns seen for consultation, 83 were hospitalised for anoxia, a frequency of 3.73%. These were newborns delivered vaginally (77.1%), from our centre's maternity unit (80.7%), whose mothers were primiparous (41%), between 18 and 25 years of age (43.4%). The main pathology associated with anoxia was neonatal infection (80.7%). According to the Sarnat classification, the severity of brain damage was stage II in 20.5% of cases and stage III in 68.7%. The case fatality rate was 16.8%. Conclusion: Perinatal anoxia is a real health problem because of its frequency and prognosis.

Keywords: Perinatal anoxia, Clinical aspects, prognosis, commune II.

INTRODUCTION

The World Health Organization (WHO) defines perinatal anoxia as the failure to establish or initiate normal breathing at birth (WHO, 2016). According to the American Academy of Pediatrics (AAP) and the American College of Obstetricians and Gynecologists (ACOG), the diagnosis of neonatal asphyxia is based on several criteria among which we can note cardiorespiratory, neurological and biological depression (Ouédraogo YS *et al.*, 2015). Perinatal anoxia is the third leading cause of neonatal mortality in the world (23%), after low birth weight (30%) and neonatal infections (25%) (WHO, 2012). In the United States of America, the incidence is 6 ‰ live births (Omo-Aghoja L *et al.*, 2014), while in Africa, its overall rate is reported to be 42 ‰ (Institut National de la Statistique, 2011). In France in 2009, it was reported that 40% of cerebral palsies were attributable to cerebral anoxia. (Meau-Petit *et al.*, 2010) In Mali, perinatal anoxia accounted for 42% of early neonatal mortality and 30% of overall mortality. It is one of the most likely causes of neurodevelopmental abnormalities in children (Sidibé T *et al.*, 2006). Although the contribution of perinatal anoxia to neonatal mortality is known in Mali, its epidemiological and clinical characteristics had never before been studied at the Bamako commune II referral health centre. This work will help to understand perinatal anoxia and improve its management. The aim of this study was to investigate

the clinical characteristics and immediate outcome of newborns suffering from anoxia.

MATERIALS AND METHODS

We carried out a retrospective cross-sectional study from 1 May 2022 to 30 April 2023 in the paediatrics department of the commune II referral health centre in Bamako, which is a 2nd level structure in the Malian health pyramid and the first referral health centre in the commune II health district. The paediatrics department receives newborn babies from our centre's maternity unit, as well as from community health centres (CSCOMs), clinics and practices in Commune II. It covered all births with anoxia in Commune II. Data were collected from registers, medical records and liaison forms between the maternity unit and the neonatology unit. The data were entered and analysed using SPSS version 20.0 software. Anonymity and confidentiality were respected.

RESULTS

During our study period, 2224 newborns were registered in the paediatric department. Of these, 83 were cases of perinatal anoxia, a frequency of 3.73%. The 18 to 25 age group was the most represented, at 43.4%.

They were primiparous in 41% of cases and had given birth in the maternity ward of the commune's referral health centre in 80.7% of cases (Table 1). The most common mode of delivery was vaginal delivery (77.1%). The pathology associated with the pregnancy was arterial hypertension (31.3%) followed by premature rupture of membranes (26% and 22%) (Fig. 1). The vast majority of newborns had severe anoxia (68.7%) (Fig. 2).

The most common pathologies found in newborns were: Probable neonatal infection 80.7% followed by hypotrophy 14.4%.

In-hospital mortality was 16.8%, and the outcome was unfavorable in 48.2% (Fig. 3).

Table 1: Breakdown by socio-demographic characteristics

Socio-demographic characteristics	Workforce	Percentage
Age of mothers		
Under 18	6	7,2
18 - 25 years old	36	43,4
26 - 35 years old	29	35
Over 35 years old	6	7,2
Age unknown	6	7,2
Parity		
Primiparous	34	41
Paucipare	23	27,7
Multiparous	18	21,7
Large multiparous	8	9,6
Place of delivery		
Commune II referral health centre	67	80,7
Community health centre	13	15,6
Practice/clinic	3	3,7

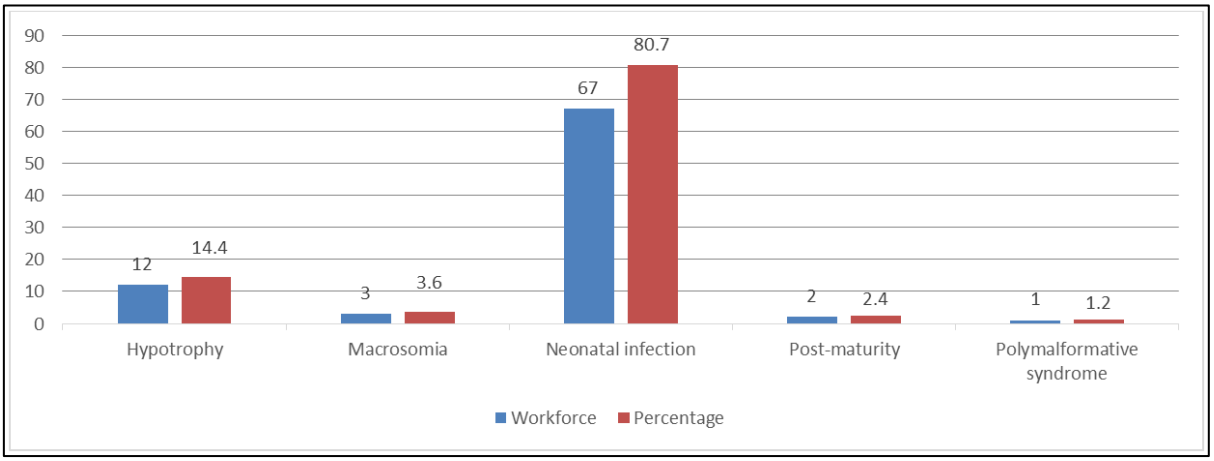

Figure 1: Distribution of newborns according to pathologies associated with pregnancy

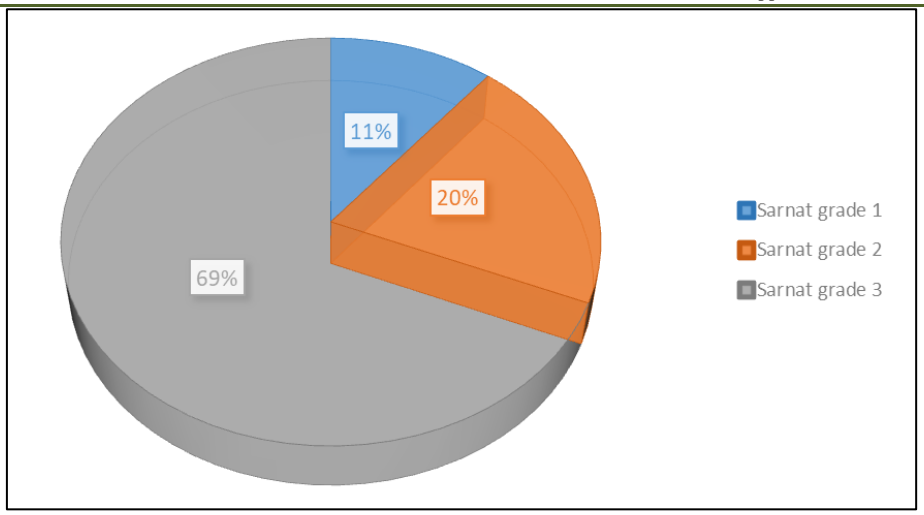

Figure 2: Distribution of neonates according to severity of anoxia

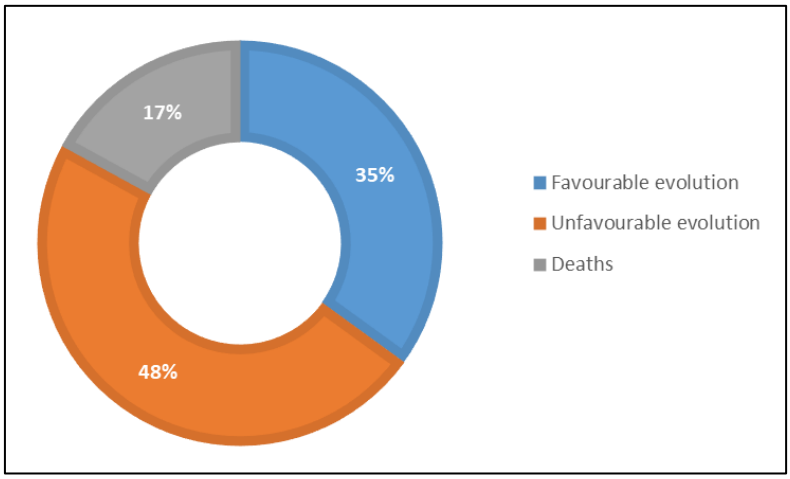

Figure 3: Breakdown of newborns by immediate outcome

DISCUSSION

We received 2224 newborns in consultation during the study period, 83 of whom were hospitalised for perinatal anoxia, i.e. 3.73%. This rate is lower than that of (West BA *et al.*, 2013) in Nigeria, (Chiabi *et al.*, 2013) in Cameroon and (Almeida *et al.*, 2017) in Benin who found 6.3%, 8% and 4.5% respectively. On the other hand, (Ouattara *et al.*, 2020) in Mali, (Koum DK *et al.*, 2018) in Cameroon and (Thiam L *et al.*, 2017) in Senegal reported higher frequencies of 21.9%, 22.9% and 20.6% respectively. The disparities between these different rates can be explained by the size of the populations studied.

Young maternal age and primiparity are significantly associated with perinatal anoxia (Almeida *et al.*, 2017). In our study, the mothers were aged between 18 and 25 years (43.4%). A maternal age of less than 25 years was also found by (Sidibé LN *et al.*, 2019) in Mali and (Aslam *et al.*, 2014) in Pakistan. In our study, maternal hypertension (31.3%) ranked first, followed by premature rupture of membranes (26.5). On the other hand, in the study by (Thiam L *et al.*, 2017), anemia was the leading cause of anoxia with 37% and maternal infection in second place with 36.4%. In terms of mode of delivery, 77.7% of newborns were born vaginally (77.1%) compared with 22.9% by caesarean section. In the study by (Thiam L *et al.*, 2017), caesarean section was the main mode of delivery at 53.3%.

Neonatal infection was the most associated pathology (80.7%) followed by hypotrophy (14.4%). This result is higher than that of Danièle *et al.*, who found neonatal infection in 55% of cases and that of Ouattara A *et al.*, (2020) who noted 58.3%. The most widely used clinical and prognostic classification for perinatal anoxia is that of Sarnat (Al Kadaoui N *et al.*, 2018). In our study, stage 1 represented 10.8% and stage 2, 20.5%. In terms of prognosis, we recorded 68.7% of severe forms. This rate is higher than those of (Ouédraogo YS *et al.*, 2015), (Ouattara A *et al.*, 2020) and (Sidibé LN *et al.*, 2019) who found 21.3%, 20.3% and 43%] of severe anoxia respectively. (Ige *et al.*, 2013) found 58% favourable outcomes and 28% deaths, while (Padayachee *et al.*, 2013) recorded a favourable outcome in 88% of cases. We observed 35% favourable

outcomes and 16.8% deaths. The management of perinatal anoxia requires an adequate technical platform (Truttmann A *et al.*, 2012). This high death rate can be explained by the limited means of treatment and monitoring within our facility.

CONCLUSION

Perinatal anoxia is a real problem in the neonatology unit of the commune II paediatrics department. It is the main cause of early death in the unit. Better monitoring of pregnancies, training of community and hospital staff and an improvement in technical facilities could improve the prevalence and prognosis in the commune.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest in this work.

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