Scientific Research Publishing

Open Journal of Pediatrics, 2022, 12, 424-432
https://www.scirp.org/journal/ojped
ISSN Online: 2160-8776
ISSN Print: 2160-8741

Epidemiological Profile of Newborns Who Died during Their Hospitalization in the Neonatology Unit, Mali Hospital

Korotoumou Wéllé Diallo[1*], Bourama Kané[1], Aboubacar Sangaré[1], Kadidiatou Touré[1], Fatoumata Léonie François Diakité[2], Mamadou Traoré[3], Mohamed Maba Traoré[4], Mamadou Berthé[5], Mariam Maiga[6], Abdoul Aziz Diakité[2], Fatoumata Dicko Traoré[2]

[1]Department of Pediatrics, Mali Hospital, Bamako, Mali
[2]Department of Pediatrics, Gabriel Touré University Hospital, Bamako, Mali
[3]Reference Health Center of Commune V, Bamako, Mali
[4]Department of Medical Imaging, Mali Hospital, Bamako, Mali
[5]National Institute of Public Health, Bamako, Mali
[6]Reference Health Center of Commune VI, Bamako, Mali
Email: *korokwd@gmail.com

How to cite this paper: Diallo, K.W., Kané, B., Sangaré, A., Touré, K., Diakité, F.L.F., Traoré, M., Traoré, M.M., Berthé, M., Maiga, M., Diakité, A.A. and Traoré, F.D. (2022) Epidemiological Profile of Newborns Who Died during Their Hospitalization in the Neonatology Unit, Mali Hospital. *Open Journal of Pediatrics*, **12**, 424-432.
https://doi.org/10.4236/ojped.2022.122046

Received: April 13, 2022
Accepted: May 20, 2022
Published: May 23, 2022

Abstract

Introduction: Neonatal mortality is a serious problem, particularly in developing countries. Objective: To study the epidemiological and clinical profiles of newborns who died during their hospitalization in the neonatology unit of the hospital in Mali. **Methodology:** This was a prospective study over a 12-month period (January 1 to December 31, 2020) including all newborns aged 0 - 28 days who died during their hospitalization. **Results:** A total of 424 neonates were hospitalized in neonatology, 54 died, or 12.73%. Newborns aged 0 - 7 days at admission were the most represented at 79.63% and 94.4% were full-term babies. The male gender was dominant with a ratio of 1.17. The following characteristics were frequently observed in the mothers: not educated (46.3%), poor 75.9%, living in urban areas (68%), housewives 75.4%, and having had less than 4 antenatal care visits (53.7%). For babies, respiratory distress and hyperthermia were the most common reasons for hospitalization (37% and 22.2%, respectively), with 40% being resuscitated at birth. Infection and perinatal anoxia were the most frequent diagnoses, respectively 96.3% and 37%. The death occurred within the first three days of hospitalization in 60% of cases. **Conclusion:** In order to reduce the mortality rate in our facilities, monitoring of pregnancy and delivery, and correct management of newborns both at birth and in the pediatric wards are important.

Keywords

Newborn, Death, Hospital in Mali

1. Introduction

Neonatal mortality is defined as the death of a child between 0 - 28 days of life. It is composed of early neonatal mortality (0 - 7 days) and late neonatal mortality (8 - 28 days). This mortality is related to both pregnancy and delivery pathologies and to socio-environmental factors [1].

According to the World Health Organization, two point five million children worldwide died in 2017 during their first month of life and more than two-thirds of these deaths occur during the first week of life [2].

In Africa, the neonatal mortality rate is the highest, estimated at 45 per thousand live births; Asia at 34 per thousand; Latin America at 17 per thousand compared to 5 per thousand in developed countries [3].

In Mali, this rate is estimated at 33 per thousand live births [1].

In 2016, a study carried out at the Mali Hospital on neonatal morbidity and mortality showed a mortality rate of 28.2%, but no study has yet been carried out on the epidemiological profile of these deaths, hence the interest of the present study, the objective of which is to study the epidemiological and clinical profile of newborns who died during hospitalization in the neonatology unit of the pediatric service of the Mali Hospital.

2. Patients and Method

2.1. Study Setting

The study took place in the neonatology unit of the pediatrics department of the Hôpital du Mali. The pediatric service of the Mali Hospital is composed of three units: a neonatology unit, a general pediatrics unit, and a pediatric emergency unit.

The neonatology unit has a capacity of 20 beds, 2 phototherapy machines, 2 incubators, and 2 heating tables, 1 bilirubin meter, 12 oxygen outlets with bubblers, 1 vacuum cleaner, and 1 ambulance. It welcomes sick newborns on a permanent basis with a day and night team.

The neonatology staff is composed of 9 agents: 1 neonatologist pediatrician, 1 general pediatrician, 1 state nurse, 1 health technician, 1 obstetrician nurse, and 4 students enrolled in a medical thesis.

2.2. Type and Period of Study

This is a prospective descriptive study that took place over a 12-month period from January 1 to December 31, 2020.

2.3. Study Population

The study included all neonates hospitalized in neonatology.

2.4. Inclusion Criteria

All neonates who died during hospitalization during the study period were included.

2.5. Non-Inclusion Criteria

Not included were deceased infants older than 28 days and any death noted on arrival.

2.6. Variables Studied

- Socio-demographic characteristics: age of the newborn, sex, age of the mother, occupation of the father and mother, education level of the father and mother, the residence of the parents, residence of the newborn.
- The course of the pregnancy: number of prenatal consultations, presence of infectious risks, completion of the prenatal check-up.
- The circumstance of the delivery: term, place of delivery, method of delivery, the notion of resuscitation at birth.
- Clinical examination: the reason for consultation, the reason for hospitalization, weight, temperature.
- Evoked diagnosis.
- Duration of hospitalization.
- Period of death.

2.7. Operational Definitions

- Newborn: is a child less than 28 days old [1].
- Neonatal mortality: any death of a live-born child occurring between 0 and 28 days of life [1].
- A full-term newborn: is a child born between 37 and 42 weeks of amenorrhea [4].
- A preterm newborn: is a child born before 37 weeks of amenorrhea [4].
- Pauper: is a woman who has had 1 or 2 births [5].
- Multiparous: is a woman who has had 3 or 4 births [5].
- Neonatal resuscitation: is the set of gestures and care aimed at restoring and ensuring adequate alveolar respiration for the newborn [6].

2.8. Data Processing and Analysis

Data were collected from the medical records of the newborns who died during the study period. In these files, the variables studied (from admission to death) were recorded and filled in. These variables were entered into a database. Data analysis was done using IBM SPSS version 25 software.

2.9. Ethical Considerations

Verbal permission was obtained from hospital officials and from the parents of the newborns for the use of the data. The use of hospital data is part of the gen-

eral knowledge contribution missions of the Mali Hospital in order to improve the general knowledge of the population and the reduction of infant and neonatal mortality.

Anonymity was guaranteed; no results were disseminated that could identify the patient. The integrity of the data was respected.

3. Results

3.1. Frequency

During the study period, 424 newborns were hospitalized for neonatology. Of the 424 newborns, 54 died, or a frequency of 12.7%.

3.2. Socio-Demographic Characteristics of Newborns

The vast majority of our newborns were admitted within the first 72 hours of life or 72.2%. The average age was 4.3 days with extremes of 0 - 25 days; the 0 - 7 days were the most represented, or 79.63%. The sex ratio was 1.17 in favor of boys. The parents resided in urban areas in more than 68% (Table 1).

Mothers with no schooling were the most represented and were housewives in 79.6% of cases (Table 2).

3.3. Clinical Aspects

More than half of our mothers had performed less than 4 ANC, or 53.7%. Almost all of our babies were born by vaginal delivery (94.4%) and more than 38% were resuscitated at birth (21/54) (Table 3).

Table 1. Distribution of newborns by socio-demographic characteristics of newborns.

	Frequency	%
Age (day)		
<1	25	46.3
1 à 3	14	25.9
4 à 7	4	7.4
>7	11	20.4
Residence		
Urban area	37	68.52
Rural area	17	31.48
Gestational age		
Term	51	94.4
Not full term	3	5.6
Sex		
Male	31	54
Female	23	46
Total	**54**	**100**

Table 2. Distribution of newborns by socioeconomic characteristics of mothers.

	Frequency	%
Educational level of mothers		
No schooling	25	46.3
Primary level	17	31.5
Secondary school level	9	16.7
Higher education	3	5.5
Mother's occupation		
Housewife	43	79.6
Shopkeeper	2	3.7
Employee	5	9.3
Pupil/Student	4	7.4
Total	**54**	**100**

Table 3. Distribution of newborns according to the number of prenatal consultations, the route of delivery and the notion of resuscitation.

	Frequency	%
Number of prenatal visits		
<4	29	53.7
≥4	25	46.3
Route of delivery		
vaginal delivery	51	94.4
Cesarean section	3	5.6
Notion of resuscitation		
No	33	61.1
Yes	21	38.9
Total	**54**	**100**

Respiratory distress and fever were the most common reasons for hospitalization, respectively 29.6% and 24.1% (Table 4).

3.4. Evolutionary Aspects

The vast majority of our babies 87% died during the first week of hospitalization of which 59.2% in the first three days and these deaths concerned the early neonatal period in more than 60% of cases (Table 5).

4. Discussion

Over a period of twelve months, from January 1 to December 31, 2020, we recorded 54 deaths among the 424 newborns hospitalized in neonatology or a frequency

Table 4. Distribution of newborns by reason for hospitalization.

Reasons for hospitalization	Frequency	%
Respiratory distress	20	37.0
Hyperthermia	12	22.2
Low birth weight	2	3.7
Lack of crying	5	9.3
Refusal to suckle	4	7.4
Digestive malformations	4	7.4
Other*	7	13.0
Total	**54**	**100**

Other*: weight loss, jaundice, plaintive cries, convulsion.

Table 5. Distribution of newborns according to duration of hospitalization and period of death.

	Frequency	%
Length of hospitalization		
<1 day	12	22.2
1 to 3 days	20	37
4 to 7 days	15	27.8
>7 days	7	13
Period of death		
1 to 7 days	33	61.1
8 to 28 days	21	38.9
Total	54	100

of 12.73%. Our result is lower than the 27.88% found by Barro Macourra *et al.* [7] in Bobo Djoulasso and the 25% found by Kalondji D.C. *et al.* [8] in the Democratic Republic of Congo, but higher than the 8% found by Kedy Koum D. *et al.* [9] in Douala, Cameroon.

In our study, the parents of our deceased neonates were out of school in 46.3% of cases. Our result reflects the low literacy rate of the general population, confirmed by a demographic health survey 6th edition [2] in 2018 according to which 65.5% of women had no education. This finding is made by M.Garba *et al.* [10] in Niamey who found a relationship between the low level of education of the mother and the death of the newborn. The mothers of our deceased newborns were mostly housewives; this was also confirmed by M. Garba *et al.* [10] who found that newborns born to housewives were three times more likely to die. More than half of our mothers had made less than 4 prenatal visits (53.7%). This low rate of prenatal consultation was also found in the study by Yaméogo W. *et al.* [11] and Kalondji D. C. *et al.* [8] in the Congo who found respectively 64.43%

and 92.9% of mothers who had less than 4 prenatal consultations. In our study, the age group most represented at admission was 0 - 7 days; the same observation was made by Barro Makoura *et al.* [7] who found that 72% of babies admitted between 0-7 days. Also Yaméogo W. *et al.* [11] in Ouagadougou found 80% of admissions during the first 24 days of life. All these figures allow us to understand the high rate of hospitalization of newborns during the first week of life. In our study, boys were the most represented with a sex ratio of 1.17. This male predominance is also found by other authors: Barro *et al.* [7] in Bobo Djoulasso; Kalondji D.C. *et al.* [8] in Congo (62.2%); Kedy Koum D. *et al.* [9] in Cameroon (55%); Yaméogo W. *et al.* [11] in Ouagadougou (58.19%); this could be linked to a supposed biological fragility of the male sex.

Forty percent of our newborns had less than 2500 g on admission, this result is lower than that of Kalondji D.C. *et al.* [8] in Congo who recorded 59.2% of newborns with a weight of less than 2500 g. This low weight could contribute in part to increasing the risk of death in these newborns.

The vast majority of our babies were born by vaginal delivery (94.4%). Our result is higher than those of Barro Makoura *et al.* [7] and Yaméogo W. *et al.* [11] who found respectively 65.83% and 66.6% of babies born by vaginal delivery. In our study, nearly 80% of the mothers had given birth at most two times. This result is confirmed by Deddy C. *et al.* [8] in Congo who recorded 72.4% of primiparous mothers. The study shows that respiratory distress was the reason for hospitalization in 37% of cases. These figures confirm the data in the literature according to which respiratory distress syndrome is a major factor of mortality in the world.

Our study shows that neonatal infection was the most frequently mentioned diagnosis alone (40%) or in combination (96.29%); this same observation was made by many other authors, including Kedy Koum D. *et al.* [9] in Cameroon in more than 90% of cases; Yaméogo W. *et al.* [11] in Ouagadougou (33.23%); Chabni N. *et al.* [12]; Barro Makoura *et al.* [7] in Bobo Djoulasso (34.31%).

The vast majority 87% of our babies died during the first week of hospitalization. This result is comparable to that of Barro who found 96% of deaths during the first 7 days of hospitalization and Yaméogo W. *et al.* [11] who found up to 38.68% of deaths only during the first day of hospitalization. In our study, death during the first week of life was the most common, or 79.63%; this result confirms those of Kalondji DC. *et al.* [8] in Congo and Yaméogo W. *et al.* [11] in Ouagadougou, who found respectively more than 90% during the first 24 days of life and 88.10% of deaths during the first 7 days of life.

5. Conclusions

The high frequency of deaths during the neonatal period is a reality at the pediatric level of the hospital in Mali. Newborns were admitted in the first week of life (early neonatal period) in 79.63% of cases. More than half of the mothers of our newborns (53.7%) had performed less than four ANC and the vast majority had

an infectious risk on history (74.1%). Respiratory distress and fever were the most common reasons for hospitalization and infection was by far the most frequently mentioned diagnosis, either alone (40.4%) or in association with other pathologies (96.2%).

This work shows us that a particular emphasis should be put on the prevention of risk factors for neonatal morbidity and mortality. However, good monitoring of pregnancy, deliveries, and correct management of newborns both at birth and in the pediatric services can help reduce the neonatal mortality rate in our facilities.

Conflicts of Interest

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

References

[1] World Health Organization (2018) Newborns: End Preventable Newborn Deaths and Stillbirths by 203.

[2] EDSM-VI (2018) Mali Demographic and Health Survey (EDSM-V).

[3] Organisation Mondiale de la Santé (2016) Enfants : Réduire la mortalité. *Aide-Mémoire*, **178**, 1.

[4] Organisation Mondiale de la Santé (2012) Les naissances prématurées.

[5] Hue, A., Koffi Dago, P. And Danho, J. (2020) La Parité A-T-Elle Une Influence Sur La Prévalence Du Syndrome Métabolique Chez La Femme D'Afrique Noire Diabétique De Type 2? *Médecine des Maladies Métaboliques*, **14**, 558-563. https://doi.org/10.1016/j.mmm.2020.07.008

[6] Betremieux, P. (2007) Prise en charge et réanimation du nouveau-né en salle de naissance: Synthèse, adaptation et commentaires pratiques des recommandations de l'International Liaison Committee on Resuscitation (ILCOR). *Médecine & Enfance*, **27**, 3-28.

[7] Neonatal Morbidity and Mortality at the SouroSanou Teaching Hospital in Bobo-Dioulasso (Burkina Faso). Barro Makoura, Sanogo Bintou, Kal. https://www.google.com/search?hl=fr&q=Morbidit%C3%A9+et+Mortalit%C3%A9+n%C3%A9onatales+au+Centre+Hospitalier+Universitaire+Sour%C3%B4+Sanou+Bobo-Dioulasso+(Burkina+Faso)+Neonatal+Morbidity+and+Mortality+at+the+Souro+Sanou+Teaching+Hospital+in++Bobo-Dioulasso+(Burkina+Faso)+BARRO+Makoura*1+SANOGO+Bintou1+,+KAL

[8] Kalonji, D.C., Mbayo, P.M., Kembo, L.N., Ngombe, M.I., Ngimbi, S.L., Nkulu, H.K., *et al.* (2018) Fréquence et causes de la mortalité néonatale précoce à Kamina, République Démocratique du Congo. *Revue de l'Infirmier Congolais*, **2**, 90-94.

[9] Kedy Koum, D., Exhenry, C. And Penda, C.I. (2014) Morbidité et mortalité néonatale dans un hôpital de district urbain à ressources limitées à Douala, Cameroun. *Archives de Pédiatrie*, **21**, 147-156.

[10] Garba, M., *et al.* (2017) Les déterminants de la mortalité néonatale précoce à la maternité Issaka-Gazobi de Niamey. *Journal de Pediatrie et de Puericulture*, **30**, 156-161.

[11] Zoungrana-Yameogo, W. (2021) Neonatal Mortality at Tengandogo University Hospital, Ouagadougou, Burkina Faso: A Retrospective Cohort Study. *Journal of*

Interventional Epidemiology and Public Health, **4**, 1-11.

[12] Chabni, N., Metri, A. and Moussouni, A. (2019) Place de l'infection nosocomiale dans la morbi-mortalité néonatale "hôpital mère enfant Tlemcen Algérie". *Lebanese Science Journal*, **20**, 503-532. https://doi.org/10.22453/LSJ-020.3.503-523