

Acute Respiratory Infection (ARI) in Children Seen in Emergency Consultation at the Pediatric Department of the Nianankoro Fomba Hospital in Ségou

Beydari, B. H^{1*}, O. S. Coulibaly², Singuepire, A³, Kante, M⁴, Sylla, F⁵, B. M. Drame⁶, Kodio, A⁷, Bamia, F¹, Kassogue, A¹, Bah, A¹, Malle, K⁸, Maiga, B⁹, Diakite, A. A⁹, Diarra, I¹⁰

¹Pediatrics Department Segou Regional Hospital, Segou, Mali

²Pediatric Surgery Department Nianankoro Fomba Hospital Segou (Mali)

³Traumatology / Neurosurgery Department Segou Regional Hospital, Mali

⁴Pediatrics Department, Csref Cv, Bamako, Mali

⁵Pediatrics Department, Csref Cii, Bamako, Mali

⁶Odonto-Stomatology / Maxillofacial Surgery Department, Nianankoro Fomba Hospita, Mali

⁷Cardiology Department Regional, Regional De Segou, Mali

⁸Direction Regionale De La Sante Segou, Mali

⁹Pediatrics Department, Chu Gabriel Toure, Bamako, Mali

¹⁰Center De Sante Communal De Reference I Bamako Mali

DOI: [10.36348/sjimps.2024.v10i01.010](https://doi.org/10.36348/sjimps.2024.v10i01.010)

Received: 15.12.2023 | Accepted: 22.01.2024 | Published: 30.01.2024

*Corresponding author: Beydari, B. H

Pediatrics Department Segou Regional Hospital, Segou, Mali

Abstract

Introduction: The aim of this study was to describe the epidemiological and clinical aspects of low-lying ARF in children aged 1 month to 14 years seen in the emergency department of the Nianankoro Fomba Ségou Hospital. **Methodology:** We included for this prospective descriptive study all children aged 1 month to 14 years of both sexes, seen in consultation at the pediatric emergency department, presenting with low-onset ARF, from January to December 2020. **Results:** The frequency of low ARF was 6.5%. More than half the patients were aged between 3 months and 2 years. Males predominated. The most frequent reason for consultation was fever. The most common diagnosis was bronchitis (63.23%). 78.6% of patients had moderate anemia and hyperleukocytosis. An opacity was found in 66.67 of the radiographs taken. Amoxicillin was the antibiotic of choice. Hospital mortality was 3.59%. **Conclusion:** ARIs are frequent in emergency consultations.

Keywords: Respiratory infection, Pediatrics, Ségou.

Copyright © 2024 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

Acute respiratory infections (ARI) are defined by the World Health Organization (WHO) as infectious diseases of the trachea, bronchi, bronchioles and lung parenchyma [1]. Acute lower respiratory infections, especially pneumonia, are the leading cause of morbidity and mortality in children under 5 years of age [2], with most deaths occurring in South Asia and sub-Saharan Africa. Over 80% occur in children under the age of two, many of whom are only a few weeks old [3]. Pneumonia deaths are falling more slowly than other leading causes of mortality, and progress is slowest in the hardest-hit countries of sub-Saharan Africa. If current trends continue, 735,000 children could still succumb to

pneumonia by 2030, breaking the pledge to end preventable child deaths made as part of the Sustainable Development Goals (SDGs) [3]. In Africa, it accounts for 21% of deaths. This rate rises to 28% if we include the neonatal period from 4 weeks after birth, i.e. almost a third of all deaths [2]. According to the Pneumoniae Etiology Research for Child Health (PERCH) study, etiological analysis of pneumonia estimated that viruses accounted for 61.4% of causes, while bacteria accounted for 27.3% and Mycobacterium tuberculosis for 5.9%, with a 30-day case-fatality rate of 6.4% [4]. In Mali, according to the Demographic Health Survey of Mali (EDSM) VI [5], the prevalence of acute respiratory infections in children under 5 years of age was 12.1%, and 6.1% in the Ségou region. The aim of the study was

to describe the epidemio-clinical aspects of low-lying ARI in children aged 1 month to 14 years seen in emergency consultation in the pediatric department of the Nianankoro Fomba Ségou hospital.

MATERIALS AND METHODS

For this prospective descriptive study were included all of children aged 1 month to 14 years of both sexes, seen in the pediatric emergency department of the Nianankoro Fomba hospital in Ségou and presenting with low-lying AKI, from January to December 2020. Neonates and children over 15 years of age were excluded from this study. Two hundred and twenty-three patients were included in the study, out of a total of three thousand four hundred and thirty consultations. Data were collected on a survey form previously drawn up and tested in the department. The variables studied were: age, gender, reason for consultation, mode of admission, parents' socio-demographic characteristics. Personal history, vaccination status, clinical signs, para-clinical signs and outcome. Data were entered using Microsoft Word. They were analyzed using Microsoft SPSS IBM version 21. The Fischer chi-square test was used to compare categorical variables. A p-value of less than 0.05 was considered statistically significant. Parental consent was obtained at inclusion.

RESULTS

During the study period, 3,430 children were seen in the emergency department, and 223 of them presented with low-lying ARI, a frequency of 6.5%. Half the mothers were aged between 18 and 25. The majority of children showing signs of low-grade ARI had mothers who did not attend school (41.7%). Housewives accounted for 61.4%. More than half the patients were between 3 months and 2 years of age. Males predominated, with a rate of 57% and a sex ratio of 1.27. Family histories of asthma and sickle-cell anemia were found in 8.9% and 1.8%. A history of recurrent rhinitis was found in 43.95% of cases; more than half the patients were correctly vaccinated according to their parents. The most frequent reason for consultation was fever associated with cough (60%). Pulmonary auscultation revealed ronchi in 43.5% of cases. The most common diagnosis was bronchitis (63.23%), followed by bronchiolitis (26%) and pneumonia (10.7%). Biologically, blood counts were performed in 35% of patients. The results showed that most patients (78.6%) had moderate anemia. More than half the patients had hyperleukocytosis. Thrombocytopenia was found in 2.4% of patients and hyperplaquetosis in 28.6%. Radiological findings included opacity in 66.67% of cases.

Amoxicillin was the most commonly used antibiotic. Corticosteroids + bronchodilators were used in 83.33% of patients. A case-fatality rate of 3.59% was recorded in our study.

The statistical test used showed a statistically significant relationship between diagnosis and patient outcome. Bronchiolitis was the most lethal.

DISCUSSION

1. Age: Our study showed that 58% of patients were between 3 months and 2 years of age. This result is comparable to those of Adedemy J D [6] and Sogoba A [7], who respectively found 43.1% and 75.2% in the 1-12 months age range in their studies. In the study by Diop M M [8], the 0-12 months age group accounted for 47.67%. The frequency and severity of ARI in this age group can be explained by the fact that, on the one hand, small children do not have a more adapted immune system. It's also linked to the immaturity of the respiratory system in small children: number of alveoli, number and size of bronchioles [9]. This age group is particularly vulnerable to infection, and is one of the targets of global programs to combat infant morbidity and mortality.

2. Sex: In our study, boys were more represented than girls, with a sex ratio of 1.27. This male predominance has been reported by several authors. Indeed, Sogoba A [7] reports a male predominance of 53.7% and a sex ratio of 1.16, while Coulibaly H [10] reports a male predominance of 54%. In contrast, a Senegalese study by Diop M M [8] found a female predominance of 55%. The predominance of males in ARI is a frequent finding with no scientifically proven explanation.

3. Vaccination status: Assessment of the vaccination status of our sample was based either on presentation of the child's vaccination record, or on the parents' statements. During our study, we noted a vaccination coverage rate of 83.41%. This result is comparable to that of Coulibaly H [10], who found 91.3% of children correctly vaccinated. It should be remembered that the EPI's objective was to achieve vaccination coverage of at least 80% among children aged 0 to 5 [5].

4. Mother's level of education: In our study, 41.7% of mothers had no schooling. According to the statistical tests we applied, the lower the level of education, the higher the frequency of ARI. The positive impact of mother's education on child health has been demonstrated by surveys carried out in Burkina Faso [11] and Senegal [12].

Education level	Number	Percentage
Primary	49	15
Secondary	66	29,2
Higher	15	12, 5
No schooling	93	41, 70
Total	223	100

5. Personal and family history: in our series, we found that 8.97% of patients had a family history of asthma and 1.7% of sickle cell disease. Personal histories of prematurity (5.8%) and recurrent rhinitis (43.9%) were also found. These results are similar to those of Sogoba A [7], who reported 10.7% consanguinity, 5.1% asthma and 1% allergy in the family. Coulibaly H [10] found that 17% of patients had a history of asthma and 13.3% prematurity. In a study of factors associated with the

occurrence of acute respiratory infections in children aged 0 to 5 years hospitalized at the Donka National Hospital in Conakry [13], certain factors were significantly associated with an increased risk of acute respiratory tract infections, namely the age of the child, the age of the caregiver, passive smoking, the absence of exclusive breastfeeding up to the age of 6 months, and the notion of contagious disease.

Family history	Number	Percentage
Asthma	20	8,97
Sickle cell disease	4	1,79
Allergy	2	0,90
No previous history	197	88,34
Total	223	100

6. Biology: NFS-CRP was performed in patients with superinfected pneumonia or bronchiolitis. Among patients who underwent CBC-CRP, 78.6% had moderate anemia, 59.5% had hyperleukocytosis, and CRP was positive in 57.78%. This test is more appropriate for

monitoring the evolution of an infection under treatment. Blood cultures and respiratory samples remain the preferred tests for etiological research. However, CRP alone cannot confirm or rule out the bacterial origin of an infection.

hemoglobin level	Number	%
N =42		
<7g/dl	3	7,1
Between 7-11g/dl	33	78,6
>11g /dl	6	14,3
white blood cell =42		
<5000	7	16,7
Between 5000-10000	10	23,8
>10000	25	59,5
C Reactive Protein (CRP) N=45		
Positive	26	57,78
Negative	19	42,22

7. Diagnosis: in our study, bronchitis was the most common diagnosis with 63.23%, followed by bronchiolitis (26%) and pneumonia (10.76%). In contrast to our results, Sogoba A [7] found 47.9% pneumonia, 37% bronchiolitis and 19% bronchitis. Sougou NM [14] in his study reported the predominance of bronchiolitis with a proportion of 38.5%, followed by acute tonsillitis and bronchopneumopathy with 17.3 and 17.23% respectively. Adedemy JD [6] found 58.5% pharyngitis, 35.9% bronchiolitis, 27.1% bronchopneumonia and 2.6% bronchitis. The predominance of bronchitis in our study could be explained by the fact that parents consult directly at the hospital instead of going to the csref and Ccom at the slightest clinical sign in a child, and that our study concerns children seen in emergency consultations unlike other studies which concerned hospitalized children.

8. Treatment: in our series, antibiotic therapy was used in all patients, with amoxicillin alone in 58.74%, amoxicillin combined with clavulanic acid in 39.01%

and ceftriaxone alone in 2.24%. Corticosteroid therapy combined with bronchodilators in 83.33%. On the other hand, in the study carried out in 2019 by A Sogoba [8], the antibiotic therapy used was ceftriaxone combined with gentamicin in 62.8%, followed by ceftriaxone alone in 33.1% and amoxicillin plus clavulanic acid in 4.1%. The choice of antibiotics can be explained by the diagnosis. Oral amoxicillin was used for bronchitis. Compliance with the national protocol is important in the management of acute respiratory infections.

9. Patient outcome: we observed a cure rate of 93.72% and 3.59% of deaths. This case-fatality rate is close to that of Sogoba A [7], who found 90.9% cures and 5% deaths. Bronchiolitis was the most lethal in our study, whereas pneumopathy was the most lethal in that of Sogoba A [7]. This difference could be explained by the severity of the initial clinical picture and, secondly, by the higher frequency of bronchiolitis in our study. Another study on the clinical, diagnostic and therapeutic aspects of bronchiolitis will enable us to determine the factors linked to mortality in the latter.

Becoming	Diagnosis					
	Bronchitis		Bronchiolitis		Pneumonia	
	Number	%	Number	%	Number	%
Living	97	100	75	88.23	37	90,24
Deceased	0	0	6	7,06	2	4,88
Discharge	0	0	4	4,71	2	4,88
Total	97	100	85	100	41	100

Fisher=17,5 P<0,05

REFERENCE

- OMS. (2009). Plan d'action mondial pour prévenir et combattre la pneumonie chez les enfants âgés de moins de 5 ans. REH, 84, 451-452.
- Aubry, P., & Gaüzère, B. A. Infections respiratoires aiguës. Actualités 2022. Centre René La busquière, Institut de Médecine Tropicale, Université de Bordeaux, 33076 Bordeaux (France) www.medecinotropicale.com
- Save The Children. A bout de souffle; appel à l'action contre la pneumonie de l'enfant, savethechildren.org.uk première parution 2017, 76 pages.
- The Pneumonia Etiology Research for Child Health (Perch) Study Group. (2019). Causes of severe pneumonia requiring hospital admission in children without HIV infection from Africa and Asia: the PERCH multi-country case-control study, *Lancet*, 394, 757-779.
- MINISTERE DE LA SANTE. (2018). Enquête démographique et de sante du mali 2018. Cellule de planification et de statistique direction nationale de la statistique et de l'informatique. Bamako, mali macro international Inc, (5).
- Adedemy, J. D., Noudamadjo, A., Agossou, J., d'Almeida, H. M., Adeye, F. R., & Ayivi, B. (2017). Épidémiologie, clinique et facteurs associés aux infections respiratoires aiguës chez l'enfant de 0-5 ans au Centre Hospitalier Départemental de Parakou (Benin). *J Afr Ped Genet Med*, 2, 47-53.
- Sogoba, A. (2019). Aspects épidémiologiques cliniques et thérapeutiques des infections respiratoires aigües basses chez l'enfant de 1 mois à 15 ans dans le service de pédiatrie du csref CII de

- Bamako 2019. Thèse de médecine. Bamako: université de Bamako, FMOS.
8. Diop, M. M., Camara, E., Barry, I. K., Barry, M. C., Barry, A., Doukoure, M. A., & Diallo, S. B. (2020). Facteurs Associés à la Survenue des Infections Respiratoires Aigües chez les Enfants de 0 à 5 Ans Hospitalisés à l'Hôpital National Donka à Conakry. *Health Sciences and Disease*, 21(3).
 9. MECANISMES DE DEFENSE DU POUMON. www.chusa.upmc.fr/pedagogie/pccm2/physio/cours_Def_pulm_p2.pdf Site consulté le 18/12/2020.
 10. Coulibaly, H. (2010). Aspect épidémioclinique des infections respiratoires aiguës chez les enfants de 0-59 mois au service de l'hôpital de Sikasso. Thèse de médecine.
 11. Baya, B. Instruction des parents et survie des enfants au Burkina Faso : Cas de Bobo-Dioulasso, Les dossiers du CEPED n° 48, Paris, CEPED, 27 pages.
 12. Bara, N. Education de la mère et la santé de son enfant : évidence pour le monde rural du Sénégal. cerdi, 65 boulevard François Mitterrand 63000 Clermont Ferrand France. <https://smartech.gatech.edu>
 13. Diop, M. M., Camara, E., Barry, I. K., Barry, M. C., Barry, A., Doukoure, M. A., & Diallo, S. B. (2020). Facteurs Associés à la Survenue des Infections Respiratoires Aigües chez les Enfants de 0 à 5 Ans Hospitalisés à l'Hôpital National Donka à Conakry. *Health Sciences and Disease*, 21(3).
 14. Sougou, N. M., Diouf, J. B., Bassoum, O., Diop, M., Kane Leye, M., & Leye, M. M. M. (2019). Aspects épidémiologiques des infections respiratoires aiguës en milieu hospitalier pédiatrique de Dakar, Sénégal. *Revue Africaine et Malgache de Recherche Scientifique/Sciences de la Santé*, 1(2).