

Acute Low Respiratory Infections in Children from 2 Months to 15 Years of Age in the Pediatric Department of the Commune II Reference Health Center in Bamako (Mali)

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Abstract

Original Research Article

Introduction: Acute lower respiratory infections (ALRIs) in paediatrics include a heterogeneous group of conditions affecting the lower respiratory tract in children. They constitute a real public health problem, particularly in developing countries. **Patient and Method:** This was a retrospective, descriptive study from 1 January to 31 December 2018, i.e. 2 years. All children aged 2 months to 15 years hospitalized for ARFU were included. **Results:** In our study, the prevalence of ARBI was 14.47%. The sex ratio was 1.16 in favour of boys. The under-5s were the most represented 97.5%. The peaks of hospitalizations were found in October 18.2%, November 16.5% and August 14%. According to the Expanded Programme on Immunisation, 12.5% of the children were not correctly vaccinated. The reasons for consultation of our patients were respiratory distress with 25.6% followed by cough and cold 24.5%. Fever was associated with 70.2%. The clinical forms were dominated by: pneumonia 47.9% followed by superinfected bronchiolitis 33.1% and acute bronchitis 19%. The majority were treated with the combination of Ceftriaxone and gentamycin, i.e. 62.8% as first-line treatment. The evolution was favourable in 90.9% of cases with 5% death, 2.5% discharge against medical advice and 1.6% referral to higher level. **Conclusion:** Low-grade ARI is a public health problem in commune II of Bamako. Raising public awareness of the early signs of low-grade ARI, strict adherence to the expanded programme of immunisation, and upgrading of community and hospital health staff will help to reduce mortality from low-grade ARI.

Keywords: Lower respiratory infections, child, commune II, Bamako.

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INTRODUCTION

Acute lower respiratory infections (ALRIs) are a heterogeneous group of conditions affecting the lower respiratory tract in children. They can affect the trachea, bronchi, bronchioles and lung parenchyma. They constitute a real public health problem, particularly in developing countries (Ly F *et al.*, 2019). According to the WHO, acute respiratory infections are the leading cause of morbidity and mortality from infectious diseases worldwide. Each year, nearly 4 million people

die from acute respiratory infections, with 98% of these deaths due to lower respiratory tract infections. Mortality rates are particularly high among infants, children and the elderly, especially in low- and middle-income countries. Acute respiratory infections are one of the most frequent causes of consultation and hospitalisation in health facilities, especially in paediatric wards (WHO, 2020). In Mali, according to EDSM VI (EDSM, 2018), Acute Respiratory Infections (ARI), fever and dehydration induced by severe diarrhoea are the main

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causes of death in children, as in most developing countries. Among children under 5 years of age, 2% had experienced ARI symptoms in the two weeks prior to the survey. In commune II of Bamako, the prevalence of ARI is not yet known, hence the interest of this study. The objectives of our study were to determine the prevalence of ARI and to describe the epidemiological, clinical, paraclinical, therapeutic and evolutionary characteristics of children hospitalised in the paediatric ward of the health centre of commune II of Bamako.

PATIENTS AND METHOD

The study took place in the paediatric department of the Centre de Santé de Référence (CSRéf) of the commune II of the district of Bamako. According to Mali's health sector policy, the health system is pyramidal, the first level being the Community Health Centre (CSCOM), the second level being the Reference Health Centre (CSRéf), and the third and fourth levels being the regional and national hospitals respectively. The health district of commune II is composed of 1 CSRéf, 8 community health centres (CSCOM), private and religious structures. The CSRéf is the first reference structure in the commune. The paediatric service receives patients referred from the 8 CSCOM, private and religious structures. This was a retrospective, descriptive study from 1 January to 31

December 2018, i.e. 2 years. All children aged between 2 months and 15 years hospitalised during this period with clinical and/or radiological signs in favour of IRAB were included. The diagnosis of IRAB was based on WHO guidelines (WHO, 2015). For each case, we collected data on a previously developed survey form. The following variables were collected: socio-demographic characteristics (age, gender, residence, month of hospitalisation); clinical variables (reasons for consultation, clinical signs on admission, vaccination status); paraclinical data (CBC, CRP, chest X-ray); therapeutic data (treatment, patient outcome); and the number of patients. Data were entered in Microsoft Word 2016 and analysed in Excel 2016 and IBM SPSS. Consent for the administration of CSRéf was obtained before starting the study.

RESULTS

During the study period, 836 children were hospitalised in the paediatric ward of the commune II health centre, including 133 for acute lower respiratory infections (ALRI), giving a prevalence of 14.47%. The male sex was predominant with 53.7% with a ratio of 1.16. The age range of 2 months to 59 months was the most affected with a predominance of children aged 2 to 11 months 75.2%. Most of the patients came from commune II (79.2%) (Table 1).

Table 1: Distribution by socio-demographic characteristics

Socio-demographic characteristics	Number	Percentage
Age		
1 - 11 months	91	75,2
12 - 24 months	20	16,5
25 - 59 months	7	5,8
60 months and over	3	2,5
Gender		
Male	65	53,7
Female	56	46,3
Residence		
Municipality II	97	80,2
Out of town II	24	19,8

The peaks of consultations were found in the months of October 18.2%, November 16.5% and August 14% (Fig. 1).

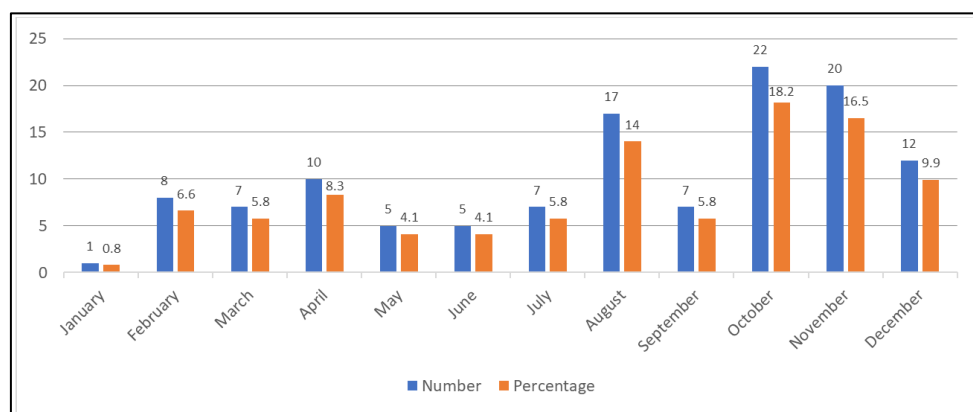


Figure 1: Breakdown by month of hospitalization

According to the Expanded Programme on Immunisation, 12.5% of children were not properly immunised. Of the children hospitalised, 86.8% had no medical history. On the other hand, the comorbidities found were heart disease 4.13%, hypotrophy 3.3%,

severe acute malnutrition 3.3% and HIV 0.87%. The reasons for consultation of our patients were respiratory distress with 25.6% followed by cough and cold 24.5%. Fever was associated with the different reasons for consultation in 70.2%.

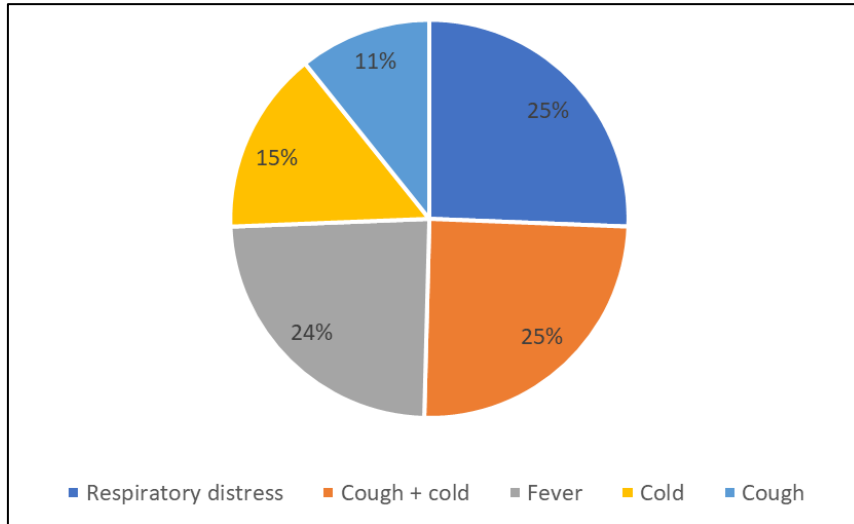


Figure 2: Reasons for consultation

The clinical forms were dominated by: pneumonia 47.9%, superinfected bronchiolitis 33.1% and acute bronchitis 19%. On the paraclinical level, all patients had a chest X-ray of which 47.9% came back pathological with the diagnosis of an image in favour of pneumonia, 52.9% of patients had a blood cell count (CBC) of which 23.1% came back normal, 19.8% of patients had a hyperleukocytosis, 44.6% patients had a reactive Protein C (CRP), 42.1% came back positive In terms of treatment, all patients were put on probabilistic

antibiotic therapy. The majorities were treated with the combination of Ceftriaxone and gentamycin (62.8%) as first-line therapy, 36.4% received oxygen therapy and 3.2% were nebulised with salbutamol.

The outcome was favourable in 90.9% of patients. There were 5% deaths, 2.5% discharges against medical advice and 1.6% referral to higher level.

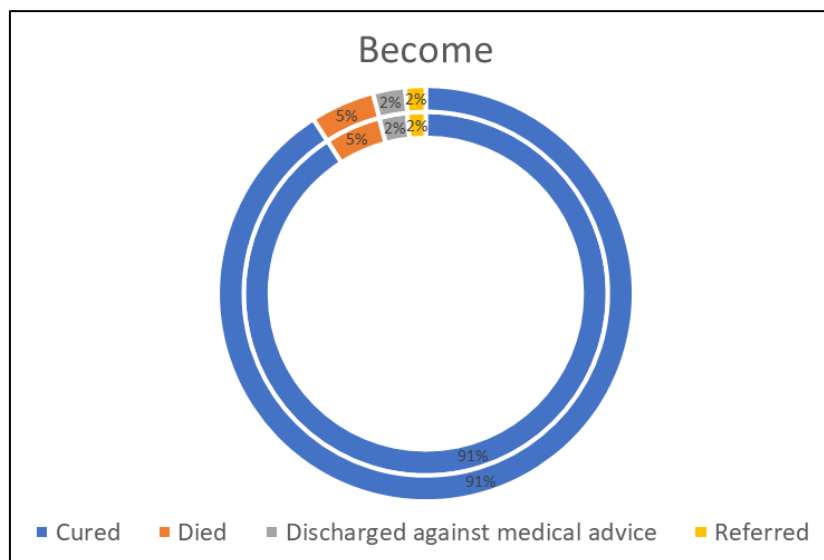


Figure 3: Breakdown by patient outcome

DISCUSSION

In our study, we had a hospital prevalence of 14.47%. Our result was higher than (Bakonde B, 1998 *et al.*) in Togo 2.61% and (Ly F *et al.*, 2019) in Senegal

10.44%. On the other hand, it was lower than (Moyen *et al.*, 2018) in Congo Brazzaville 19.8%. This could be explained by the environmental and different conditions. The age range of less than 2 months to 5

years was largely in the majority 97.5% with a predominance of the age range of 2 to 11 months. Our result is similar to that of (Ly F *et al.*, 2019), (Kané B *et al.*, 2020) and (Bakondé B 1998 *et al.*) who all found this large predominance in children under 5 years. This could be explained by the immune immaturity in this age group. The vulnerability of this age group would be related to the immaturity of their immune system and the nasopharyngeal carriage of certain germs (Leung AKC *et al.*, 2018) In our series, the majority of patients were male (53.7%), this male predominance has also been described by (Diagne G *et al.*, 2020) and (Ilham Benchekroun *et al.*, 2017). The vast majority of children resided in commune II 79.2%. This could be explained by the place of study. We found peaks of hospitalisation in October 18.2% followed by November 16.5% and August 14%. This predominance in rainy season was also found by (Ly F *et al.*, 2019) May 17.4, September 16.5 and June 12.6. On the other hand, (Diagne G *et al.*, 2020) found peaks in consultations in August, March and April with 22%, 15.6% and 12.8% respectively. In our study, 87.5% of children were correctly vaccinated according to the expanded programme on immunisation. Our result is similar to that of (Ly F *et al.*, 2019) 82% but lower than that of (Diagne G *et al.*, 2020). Our figure confirms the EPI figures of the EDSM VI according to which 80% of children had received the first dose of the pneumococcal vaccine (EDSM VI, 2018). A comorbidity was present in 11, 36%, i.e. respectively heart disease 4.13%, hypotrophy 33.3%, severe acute malnutrition 3.3% and HIV 1 case 0.87%. The reasons for consultation of our patients were respiratory distress 25.6% followed by cough and cold 24.5%. Fever was associated with the different reasons for consultation in 70.2%. These symptoms are classically used by the WHO (WHO, 2015) to make the diagnosis of pneumonia. In our series, the clinical forms were dominated by: pneumonia 47.9%, superinfected bronchiolitis 33.1% and acute bronchitis 19%. Our result is superposable to that of (Ly F *et al.*, 2019) who also found a predominance of pneumonia followed by acute bronchiolitis respectively 52.41% and 39.80%, just as in (Oliveira *et al.*, 2011) in Brazil who also reported this same predominance of bronchopneumonia (82%) followed by bronchiolitis (10%). On the other hand, in Morocco, asthma exacerbations represented the majority of cases (51.1%) followed by acute bronchiolitis (24.4%) (Ilham Benchekroun *et al.*, 2017) and (Ngombe LK *et al.*, 2014) in Congo who found bronchiolitis to be the majority (12.4%) followed by bronchitis (7.2%). This could be explained by the predominance of pneumonia as the primary reason for consultation and even death in children under 5 in sub-Saharan Africa. (WHO, 2022) On the paraclinical level, all patients had a frontal chest X-ray and in almost half of the cases, the diagnosis was based on the radiological images. Our result is lower than that of (Ly F *et al.*, 2019) who diagnosed 82.1% of cases based on radiological images. CBC was done in 52.9% and

19.8% had hyperleukocytosis. Hyperleukocytosis was present in 80% of cases in (Ly F *et al.*, 2019). This situation could be explained by the non-effectiveness of the blood count in all our patients due to lack of financial means. CRP was performed in 44.6% of which 42.1% were positive. Our result is similar to that of (Ly F *et al.*, 2019) who had a positive CRP in almost half of the cases, higher than that of (Thiongane A *et al.*,) 36.8% and lower than that of (Sow A *et al.*, 2009) 55.4%. The use of CRP alone does not confirm or deny the bacterial origin of an infection. It is more appropriate for monitoring the evolution of an infection under treatment. In terms of treatment, 62.8% of pneumonia patients benefited from Ceftriaxone plus gentamycin as first-line treatment. Our result is superposable to that of (Ly F *et al.*, 2019) which finds the predominance of the prescription of Ceftriaxone and gentamicin. This situation could be explained by the non-observance of the pneumonia treatment protocol (WHO 2015) in our department as in (Ly F *et al.*, 2019) in Senegal. The evolution was favourable in 90.9% of patients. We observed 5% of deaths. Our mortality rate is higher than that of (Diagne G *et al.*, 2020) and (Ly F *et al.*, 2019) who found respectively 1.3%, 3% of deaths. However, it is lower than those of (Moyen E *et al.*, 2018) 16.25% and (Bakonde B *et al.*, 1998).

CONCLUSION

Acute lower respiratory infections constitute a real public health problem in Mali like in other developing countries. Our study allowed us to have more knowledge about these pathologies in commune II in order to improve their management within our structure. Raising public awareness of the early signs of low-grade ARI, strict adherence to the vaccines of the expanded programme on immunisation, and the upgrading of community and hospital health staff will further improve management and reduce mortality from low-grade ARI.

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