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## Factors associated with hospital mortality of children aged 1 to 60 months in Guédiawaye, Senegal

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### Abstract

To determine the characteristics of hospital morbidity and mortality in the paediatric department of the Roi Baudouin Hospital in children aged 1 to 60 months, a retrospective descriptive and analytical study from 1 January 2018 to 31 December 2021 was conducted. The in-hospital mortality rate was 0.96% and the factors associated with death were the age group 1-12 months ( $p < 0.001$  and  $OR = 5.33$ ), acute malnutrition ( $p = 0.007$  and  $OR = 3.37$ ) and cardiac disease ( $p = 0.017$  and  $OR = 5.1$ ).

**Keywords:** Mortality, children, Senegal

### Introduction

According to the latest report of the United Nations Interagency Group for Child Mortality Estimation (UN-IGME) published in 2021, the world is still not on track to meet the sustainable development goals of ending preventable deaths of infants and children under five <sup>[1]</sup>. The number of under-five deaths worldwide remains alarmingly high, particularly in the world's poorest countries, despite considerable efforts. Senegal, like other countries in sub-Saharan Africa, has a high infant and child mortality rate of 37‰ live births <sup>[2]</sup>. In order to meet the SDGs in 2030 and achieve an infant and child mortality rate of 20‰ live births according to the country's projections, there is an urgent need to know the characteristics of morbid conditions and the main causes of death in health facilities. The general objective is to determine the characteristics of hospital morbidity and mortality in the paediatric department of the Roi Baudouin Hospital in children aged 1 to 60 months.

A retrospective descriptive and analytical study from 1 January 2018 to 31 December 2021 was conducted. The data collected were sociodemographic, clinical and evolutionary. Factors associated with death were analysed, a p-value strictly less than 0.05 was significant. A total of 2299 children were registered during the study period, with a male predominance of 58.33%. The highest rate of hospitalisation was observed during the months of September and October, with 12.83% and 11.31% respectively. The average age of the children was  $22.09 \pm 15.90$  months, the mode and median were 24 and 19 months respectively. The 1-12 month age group was most representative with 29.06% followed by the 13-24 month age group with 26.40%. The age group between 37 and 48 months was less represented with 11.35%. In terms of diagnostic groups, respiratory, digestive and neurological diseases were more frequent with 37.63%, 24.88% and 14.27% respectively. Severe acute malnutrition and cardiac diseases represented 10.18% and 2% respectively. Respiratory diseases were dominated by bronchiolitis (56.30%), asthma crisis (15.95%) and pneumonia (10.07%). Digestive diseases were dominated by gastroenteritis complicated by dehydration (86.81%). Neurological diseases were dominated by febrile seizures (38.1%), meningitis (15.8%) and epileptic seizures (8.3%). Cardiac diseases were mainly dominated by congenital heart disease with 83.3%. The average duration of hospitalization was  $4 \pm 2.7$  days, with extremes of 1 and 30 days. The majority of children had a favorable evolution while 1.44% of children were referred to other structures. The hospital mortality rate was 0.96% ( $n = 22$ ). The peak of deaths occurred in 2020 (36.36%) and 2021 (36.36%) and in the months of January (27.27%) March (22.73%) and August (18.18%). The average age of death was  $12.5 \pm 14.5$  months with extremes of 1 to 48 months. The mode and median were 4 months and 6 months respectively. The age range of 1-12 months was more representative with 68.18%.

The diagnostic groups causing death were dominated by severe acute malnutrition (27.27%), digestive diseases (22.73%) and respiratory diseases (18.18%). Cardiac diseases accounted for 9.09% of deaths. The study of factors associated with death showed a significant association with the age group 1-12 months ( $p < 0.001$  and  $OR = 5.33$ ), acute malnutrition ( $p = 0.007$  and  $OR = 3.37$ ) and heart disease ( $p = 0.017$  and  $OR = 5.1$ ). (See table)

The hospital mortality found in this study seems low compared to those found in Dakar (10%), Ivory Coast (10.64%) and Togo (15.6%) [3, 4, 5]. This mortality was higher for the 1 to 12 month age group (68.18%) with a statistically significant link ( $p < 0.001$  and  $OR = 5.33$ ). The first months of life are the most vulnerable period for child survival. According to WHO, children aged 1-11 months accounted for 1.5 million deaths in 2019 worldwide, the second highest proportion after newborns [6]. Acute malnutrition was statistically associated with death with  $p = 0.007$  and  $OR = 3.37$ . Seck and Sylla found in their studies that malnutrition was the main factor in mortality in children less than 5 years of age (31%) [3, 7], whereas Asse et al. in Ivory Coast found that malnutrition accounted for only 1% of deaths [4]. Severe acute malnutrition, through its complications, is still a major public health problem and is an independent risk factor for death in hospitalized Senegalese children [3]. Deficiency malnutrition is associated directly or indirectly with one third of child deaths in Senegal, compared to 45% of such deaths worldwide [6]. Finally, the last factor associated with the occurrence of deaths in this study was heart disease ( $p = 0.007$  and  $OR = 3.37$ ). The management of congenital or acquired childhood heart disease in sub-Saharan African countries still poses enormous difficulties in terms of diagnosis and access to treatment, particularly surgery. High case fatality rates have been described in Senegal (24.4%) and Ivory Coast (20.4%) [8, 9]. An increase in the medical-surgical technical platform will improve the diagnosis and management of these heart diseases in children with a view to achieving target 3.2 of MDG 3, which consists of eliminating avoidable deaths of newborns and children under 5 by 2030.

In conclusion, pediatric hospital mortality for children aged 1 to 60 months remains high and dominated by heart disease and malnutrition in our context. Interventions aimed at improving the diagnosis and management of heart disease on the one hand, and the fight against malnutrition on the other, would make it possible to reduce under-five mortality with a view to achieving the sustainable development goals.

**Table 1:** Factors associated with mortality

Factors associated with mortality	ajOR [IC 95%]	p-value
[1-12 months]	5,33[2,16-13,13]	<0,001
Cardiac diseases	5,08[1,15-22,38]	0,017
Malnutrition aigue	3,37[1,31-8,69]	0,007

#### Conflict of Interest

Not available

#### Financial Support

Not available

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