



Epidemiological, Clinical and Biological Aspects of Childhood HIV in Libreville

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Human immunodeficiency virus (HIV) infection is a chronic viral infection characterized by the progressive destruction of CD4 T lymphocytes. Its prevalence in Gabon is estimated 4.1% with approximately 2,500 affected children. This pathology remains a real public

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health problem on a global scale. The objective of our work was to describe the epidemiological, clinical and biological aspects of HIV-positive children in Libreville.

Materials and Methods: This is a retrospective study which involved patients followed in the four major pediatric care centers in Libreville from January 2015 to December 2022. We included all complete medical records of children and adolescents aged 0 to 19 years with positive HIV serology or PCR.

Results: The mean age was 10.6 ± 5.1 years. The 10-14 year old group represented 32.3%. The sex ratio was 1.13 male to female. In our study 46.9% were orphans and they were more affected by academic delay (51.9% versus 45.7%). The clinical signs were dominated by fever (40.6%). The main opportunistic infection found was digestive (7.3%) and tuberculosis represented the first co-infection (13.2%). We had 5.2% of patients with acute malnutrition.

Conclusion: HIV-AIDS in children remains a public health problem given its socio-economic impact on the population. The cost of follow-up assessments and hospitalizations are among the problems that slow down the regular follow-up of our patients.

Keywords: HIV; epidemiology; child; libreville.

1. INTRODUCTION

Hiv remains a major cause of morbidity and mortality among adults and children worldwide. In 2022, unaids estimated the number of people living with hiv (plhiv) at 38.4 million, 66% of whom resided in sub-saharan africa (UNAIDS 2022). This part of the world, which is the most affected, represents 14.5% of the world population (UNAIDS 2022). The number of infected children and adolescents worldwide was estimated at 2.8 million and 88% of them were in africa (UNICEF 2021). Despite improvements in coverage and effectiveness of prevention of mother-to-child transmission of hiv (pmtct) interventions worldwide, the number of children under 15 living with hiv is increased from 1.5 million in 2001 to 3.5 million in 2010. The number of new infections among children and adolescents is estimated at 300,000 worldwide. Approximately 18% of hiv-related deaths occur among children [(UNICEF 2021). In gabon, the hiv prevalence rate is estimated at 3.6% in the general population. Nearly 2,500 children are affected according to the latest epidemiological surveillance bulletin from unaids gabon and only 587 children are known and currently cared for UNAIDS (2021) Given the few studies carried out on this pathology in children in gabon, and in order to contribute to improving pediatric care, we opted to study the epidemiological, clinical and biological aspects of hiv infection in children followed in all major pediatric care centers in libreville.

2. MATERIALS AND METHODS

This is a retrospective, multicenter, descriptive and analytical study ranging from January 2015

to December 2022 which took place in large pediatric outpatient treatment centers (CTA) in Libreville. We included all patients with positive HIV serology or PCR aged 0-19 years. Through the analysis of medical records, we listed the various epidemiological, clinical and paraclinical parameters on a standardized form. The statistical analysis was carried out using SPSS software version 25. The comparison between categorical variables was carried out using the Chi2 test (or Fisher for small numbers) and the comparison of means using the Student T test.

3. RESULTS AND DISCUSSION

We included 288 children, for a participation rate of 83.5%. The sex ratio was 1.13 male to female. The average age of the sample was 10.6 ± 5.1 years with extremes of 2 months and 19 years. The 10-14 year old group represented 32.3% of the study group. The distribution according to the place of recruitment classified: The CTA of Libreville represented 55.6% of the patients recruited followed by the University Hospital Center mother Foundation JEANNE EBORI (CHUMEFJE) (21.2%), the CTA of NKEMBO (15.3%) and the Hospital Instructions of the Armies OMAR BONGO ONDIMBA (HIAOBO) (8%). There were 188 children in school, or 65.3% of the total enrollment, and 47.6% were behind in school. The sample consisted of 135 orphans (46.9%) of whom 105 were maternal orphans (36.5%). The head of the family was unemployed in 39.6% of cases. Parents with an average income numbered 151 or 52.4% of the sample, low and high income had respectively 106 and 31 cases or 36.8% and 10.8%. The mothers had a positive serological status in 93.1% of cases (268 women). PMTCT was not

performed in 97.2% of cases (280). Six mothers (2.1%) had realized this and in 0.7% of them it had not been notified. Patients were referred in 53.5% of cases with a positive VRS, in 7% of cases for an opportunistic infection and for 39.6% of cases these were patients whose mothers were suspected of being infected with HIV. Fever was the main sign in 40.6% of cases followed by convulsions in 0.7% of cases. Digestive pathology represented 7.3% of cases, followed by dermatological and respiratory pathologies. Extra pulmonary tuberculosis was present in 13.2% of cases. Lung involvement alone represented 11.2% of co-infections. The rate of acute malnutrition among patients increased from 5.2% at the initial consultation to 2.8%. Putting them on ART treatment allowed the children to have a better general condition, underweight represented respectively 43.8% at the start of ART and 24.3% of cases at the last consultation. During the initial consultation, patients presenting with growth retardation represented 4% of cases. At the last consultation these figures increased to 5%. Patients in clinical stage 3 represented 27.8% and those in stage 4, 5.2%. These two groups combined totaled 33% or a third of the entire sample. At the last consultation these figures rose to 5.9% for the two groups combined. After initiation of ART one hundred and eighty six patients or 64.6%, had an undetectable viral load and forty nine of them had a detectable viral load, or 17%, with extremes ranging from 1040 to 7,310,000 copies/ml. Fifty-three patients, or 18.4%, had not performed a CV. The average CD4 count went from 554/mm³ compared to 674/mm³ for a maximum of 3039 and 2159. We had two hundred and fourteen patients or 84.6% with a CD4 count below 1000/mm³ corresponding to moderate or severe immunosuppression during of the initial consultation and 15.4% of patients had a CD4 count > 1000/mm³.

This is the first work carried out in Gabon covering the four major pediatric care centers. During the study period we consulted 345 files of children aged 2 months to 19 years and retained 288.

Socio-demographic characteristics: Our study reveals a male predominance of around 53.1% compared to 46.9% girls, i.e. a sex ratio of 1.13. This male predominance was found in Morocco (Rizkou 2018 and Dipesalema et al. 2014, Pufall et al. 2006) Botswana and Zimbabwe at 53.1%, 52.4% and 50.5% respectively. Traore in Mali (2012) and Luque et al. (2017) in Latin America

found a female predominance of around 76.3% and 53%. These studies demonstrate that HIV AIDS affects patients of both sexes in almost similar proportions. The average age of the sample was 10.6 ±5.1 years with extremes ranging from 2 months to 19 years. The 10-14 year old group represented 32.3% of the study group. Kobangue in Central Africa (Kobangue et al. 2016) found a lower average age of 6.5 years with extremes ranging from 4 months to 15 years. Cissé (Cissé et al. 2019) in Senegal had results lower than ours with an average age of 8 years and extremes ranging from 6 months to 19 years. Tshikwej Ngwej et al. (2020) in the Democratic Republic of Congo found an average age of 9 years for extremes ranging from 3 years to 15 years. Our study reveals an obvious late diagnosis with an average age of 10 years. Our study sample consisted of 135 orphans (46.9%) and 21 (7.3%) were orphans of both parents. Kouadio et al. (2023) found a proportion of 47.4% Kalla et al. (2020) in Cameroon and Cissé et al. (2019) in Senegal found similar figures, respectively 40.9% and 43% orphans. On the other hand, Tshikwej Ngwej found a higher proportion of around 75.8% of orphans (Tshikwej et al. 2020) HIV AIDS is a major source of orphans with the hazards that this status causes in terms of health, psycho-emotional balance, education, social and economic status. In our study, school children represented 65.3% of the population. Among them, 47.6% were behind in school. Kouadio in Ivory Coast found a proportion of 58%. There was a significant association between educational level and orphan status. We observe that orphans were more often late (51.9% versus 45.7%), or not in school (26.7% versus 13.9%) than non-orphans. There is a statistically significant difference between the groups in terms of educational status. In particular, it is observed that children who were orphaned by both parents and children who were fatherless had the highest percentage of children falling behind, while non-orphaned children had the highest percentage of children with normal academic status. . HIV impacts schooling. Most chronic illnesses are a source of repeated absences, pain, fatigue and the inability to participate in all activities. HIV causes high morbidity in children before treatment (Kouadio et al. 2023). He is responsible for orphans, which further threatens the education of these children. The head of the family was unemployed in 39.6% of cases. Patients from low-income families numbered 106 or 36.8%. Ismail and Rizkou (2018) and Rizkou (2018) in Morocco found respectively 95% and 75.51% of patients from

families with low income. These populations are probably more vulnerable due to the lack of information. It is therefore essential to strengthen prevention activities by raising awareness among these populations. Low financial income has been identified by several authors as being one of the main obstacles to adherence to health care in general. The provision of care has been improved, in particular thanks to coverage by national health insurance. The mothers had positive HIV serology in 93.1% of cases compared to only 17% of the fathers. Diagne-Guèye (Diagne-Guèye et al. 2016) in Senegal found 96% of mothers infected compared to only 39% of fathers. Barry M.C et al. (2019) had 89.3% of mothers HIV positive compared to 19% of fathers HIV positive. This reflects a predominant vertical transmission which can be prevented by accessible means (Monpoux & Warszawski 2016). PMTCT was not performed in 280 mothers or 97.2% of cases. Barry M.C found a larger proportion of around 14% of mothers who had benefited from follow-up (Barry et al. 2019).

Anamnestic and clinical characteristics: Patients were referred in 53.5% of cases with a positive VRS and for 39.6% of cases it was a family screening. Thiam et al. (2021) found family screening first in 24% of cases, while Ismail (2018) and Rizkou (2018) similarly found parental seropositivity in 28.5% and 40% respectively. Fever was the most common discovery circumstance in 40.6% of cases, followed by cough (18.8%) and diarrhea in 5.9% of cases. Ismail I. in Morocco (Ismail 2018) initially found cough (65%), fever (30%) and diarrhea (20%). Pedrini et al. (2015) mainly found cough of less than 15 days first (51%), skin lesions (27.8%), fever (16.9%) and cough of more than 15 days (13.3%). For Thiam et al. (2021) in Senegal, chronic cough was the first reason for consultation in 16 patients (64%), followed by prurigo (36%), chronic diarrhea (32%) and finally digestive candidiasis (32%). Digestive pathology represented 7.3% of cases, followed by dermatological and respiratory pathologies (4.5% each). Yamini in India (Yamini et al. 2015) and Fru in Cameroon (Soh et al. 2014) found values of around 27.73% and 34.4% for respiratory infections, 13.4% and 14.75% dermatological, 8.75% and 27.8% digestive. Extra pulmonary tuberculosis was present in 13.2% of cases. Lung involvement alone represented 11.2% of co-infections. For Ubesie (Ubesie et al. 2014) pulmonary tuberculosis-HIV co-infection affected 32.4% of the cases in his

study. As for Bangoura (Bangoura et al. 2023) in Guinea, he found 32.7% of pulmonary tuberculosis co-infection followed by lymph node tuberculosis. These figures are lower than those of our study but the result is the same, tuberculosis is the most documented opportunistic infection in HIV and mainly the pulmonary form. In our study, we had patients suffering from acute malnutrition of around 5.2%. Underweight was found in 43.8% of patients and growth retardation in 4% of them. In (Djadou et al. 2018) acute malnutrition, underweight and growth retardation concerned 60.2%, 69.1% and 70.8% respectively. Jesson (2016) and Mwadianvita et al. (2014) respectively found a prevalence of 42% and 60.8% of malnutrition in their study. Patients being at the clinical stage 3 represented 27.8% and those in stage 4, 5.2%. These two groups combined totaled 33%, or a third of the entire sample. At the last consultation these figures rose to 5.9% for the two groups combined. For Diancoumba (2018) stage 3 represented 40.5% for a combined stage 3 and 4 of 66.2%. Takassi et al. (2018) had 47.8% of the population at stage 3 and for the two groups (stage 3 and 4) 60%. These rates were double those found in our study at the initial consultation. The pre-therapeutic assessment was without abnormality in 158 patients (54.9%), 130 (40.6%) of them had an abnormal assessment. Anemia was found in 29.2% of cases. The study Kobangue et al. (2016) found anemia in similar proportions (33.9%). For Thiam et al. (2021) Diancoumba (2018) and Prakash (Poudel et al. 2014) these figures were higher by 65%, 64.86% and 74.4% respectively. This significant difference with our study could be explained by the numbers of the different studies. Indeed, except for the Kobangue study and ours, the other three had fewer than 100 patients. We had 214 patients, or 84.6%, with moderate to severe immunodeficiency with a CD4 count below 1000/mm³ during the initial consultation. During the first consultation, 35 patients or 12.1% had not carried out the CD4 count. Takassi et al. (2018) and Diancoumba (2018) found respectively 84.6% and 77% of moderate or severe immunosuppression, figures similar to ours. Tshikwey et al. (2020) and Kalla et al. (2015) had figures higher than ours with a rate of moderate or severe immunosuppression of the order of 95.2% and 91.6% respectively. Around 186 patients or 64.6% had an undetectable viral load and 49 (17%) of them had a detectable VL. In the literature, we found in Guinea Conakry (Barry et al. 2019) 89.8% of patients in the study with an undetectable CV, while 10.2% had a

detectable CV of between 5000 and 100,000 copies/ml. Barro et al. (2020) and Thiam et al. (2021) found respectively 45.3% and 77.8% of detectable CV in their studies. Most of the countries cited have programs including free viral loads for people living with HIV. In our country, this free service is occasional

4. CONCLUSION

HIV/AIDS remains a major public health and socio-economic development problem throughout the world and in sub-Saharan Africa in particular. Interesting progress has been made at the national level in the care of children infected with HIV, notably the implementation of ACTs in general and pediatric ACTs in particular, even if they are still insufficient in number. This study allowed us to demonstrate that antiretroviral treatment has a clear benefit for children and adolescents living with HIV, that this treatment must be provided early and that it is urgent to improve transmission prevention. mother child in Gabon.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

We declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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