

SUMMARY

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 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.

Material and method: 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 [1]. This part of the world, which is the most affected, represents **14.5%** of the world population [1]. The number of infected children and adolescents worldwide was estimated at **2.8** million and 88% of them were in africa [2]. 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 [2]. 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 [3]. 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. Material and method

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 [4], Botswana [5] and Zimbabwe [6] at [53.1%](#), [52.4%](#) and [50.5%](#) respectively. Traore in Mali [7] and Luque [8] 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 [9] found a lower average age of [6.5](#) years with extremes ranging from 4 months to 15 years. Cissé [10] 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 [11] 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 [12] found a proportion of [47.4%](#) Kalla in Cameroon [13] and Cissé [10] 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 [11]. 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 [12]. 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 [14] and Rizkou [4] 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 [15] in Senegal found 96% of mothers infected compared to only 39% of fathers. Barry M.C [16] 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 [17]. 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 [16].

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 [18] found family screening first in 24% of cases, while Ismail [14] and Rizkou [4] 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 [14] initially found cough (65%), fever (30%) and diarrhea (20%). Pedrini M [19] 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 [18] 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 [20] and Fru in Cameroon [21] 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 [22] pulmonary tuberculosis-HIV co-infection affected [32.4%](#) of the cases in his study. As for Bangoura [23] 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 [24] acute malnutrition, underweight and growth retardation concerned [60.2%](#), [69.1%](#) and [70.8%](#) respectively. Jesson [25] and Mwadianvita [26] 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 [27] stage 3 represented **40.5%** for a combined stage 3 and 4 of **66.2%**. Takassi [28] 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 Kobangue study [9] found anemia in similar proportions (**33.9%**). For Thiam [18], Diancoumba [27] and Prakash Poudel [29] 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 [28] and Diancoumba [27] found respectively **84.6%** and 77% of moderate or severe immunosuppression, figures similar to ours. Tshikwej Ngwej [11] and Kalla [30] 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 [31] **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 Makoura [32] and Thiam [18] 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.

We have no conflict of interest

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