

# Seroprevalence of HIV in polytransfused adult sickle cell disease: Case of the center of mixed medicine and SS anemia of kinshasa

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## Abstract

**Context:** Sickle cell disease is an inherited disease of hemoglobin, which is manifested primarily by vaso-occlusive or hemolytic crises and often requires a recurrent therapeutic transfusion. Its prevalence in sub-Saharan Africa is very high.

**Objective:** To establish seroprevalence of HIV in polytransfused adult homozygous sickle cell patients at the Center of Mixed Medicine and Anemia SS (CMMASS) in Kinshasa.

**Methods:** A retrospective study was conducted at the CMMASS between January 2006 and June 2017 to determine the number of confirmed cases of HIV infection in homozygous adult polytransfused patients. Have been included, all patients diagnosed by electrophoresis of hemoglobin and who received a minimum of 2 blood transfusions during the study period.

**Results:** One hundred and eighty (180) patients constituted the study sample. The age was in the range of 18 to 50 years with a median of 29 years. The most represented age group was 18 to 23 years (48.33%). The female gender was the most represented (64.44%) with a sex ratio of 1.77 (women / men). HIV seroprevalence was of 8.33% (N = 15).

**Conclusion:** The seroprevalence of HIV in the population of polytransfused adult sickle cell disease at the Center of Mixed Medicine and Anemia SS of Kinshasa is 8.33% for the interval from 2006 to 2017.

## Introduction

Sickle cell disease is a genetic disease with autosomal recessive inheritance by mutation of a hemoglobin  $\beta$ -chain gene, which induces the synthesis of abnormal hemoglobin, hemoglobin S (HbS), primarily responsible for all Vaso-occlusive clinical manifestations and chronic hemolysis with anemia of varying degrees [1]. According to the World Health Organization (WHO), about 300,000 children are born each year worldwide with this disease; it is especially prevalent in sub-Saharan Africa, where it accounts for one in 65 births [2-4]. The Democratic Republic of Congo (DRC) is particularly affected with about 1,620,000 homozygous sickle cell patients, which represents 2% of its estimated population of more than 81 million in 2017 [5,6]. One of the major problems faced by homozygous sickle cell patients is the recurrent therapeutic transfusion, which exposes them to various infections, in this case HIV. This is the consequence of a misapplication of the principles of transfusion safety. A prospective study was conducted in 1992 in the DRC at Kinshasa University Clinics (CUK) on 256 homozygous polytransfused homozygous children; she had detected 14 cases (5.5%) of HIV infection [7].

The objective of this study was to update HIV seroprevalence data in polytransfused patients in Kinshasa, particularly adult homozygous sickle cell patients, to make an assessment of the observance of transfusion safety principles, in order to improve their care.

## Methods

### Place of study

The present study was carried out at the Center of Mixed Medicine and Anemia SS (CMMASS) of Kinshasa, DRC.

### Type of study

This is a retrospective study of cases of polytransfused homozygous sickle cell patients, followed at CMMASS in Kinshasa from January 2006 to June 2017, in order to establish a seroprevalence for HIV infection among this population.

### Study population

These are homozygous sickle cell patients over the age of 18, followed at the CMMASS from January 2006 to June 2017.

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## Inclusion criteria

Were included in this study, the records of all homozygous sickle cell patients diagnosed by electrophoresis of hemoglobin, and who had received a minimum of 2 blood transfusions from January 2006 to June 2017.

## Criteria of non-inclusion

The following were not included in this study: (i) records of all heterozygous sickle cell patients, (ii) records of all sickle cell patients who had no information related to hemoglobin electrophoresis, (iii) the records of all patients who received only one blood transfusion during the study period, and (iv) the records of homozygous sickle cell disease recognized as PVV prior to blood transfusion at CMMASS.

## Parameters of interest

Parameters of interest were age, sex, electrophoresis of hemoglobin, number of blood transfusions received, and HIV serologic control of the patient.

## Results

One hundred and eighty (180) homozygous sickle cell patients diagnosed by electrophoresis of hemoglobin and who had received at least 2 blood transfusions, were selected for the study.

### Sex Ratio

One hundred and sixteen (64.44%) patients were women and 64 (35.55%) men, a sex ratio of 1.77 (women/men).

### Age groups

The age of the patients ranged from 18 to 50 years with a median age of 29 years. The most represented age group was 18 to 23 years old with 87 patients (48.33%) followed by 24 to 29 years (21.11%).

### Marital status

One hundred seventy-two (95.55%) patients were single; 5 (2.77%) married; 2 (1.11%) divorced and 1 (0.55%) widowed.

### Number of blood transfusions and electrophoresis of hemoglobin

All patients were diagnosed by electrophoresis of hemoglobin and received a minimum of 2 blood transfusions during the study period.

### HIV seroprevalence

Fifteen (15) patients (8.33%) contracted HIV between January 2006 and June 2017, following a blood transfusion at CMMASS.

## Discussion

The objective of this study was to establish seroprevalence of HIV in the homozygous adult poly-transfused sickle cell population at CMMASS in Kinshasa, with a view to filling the information gap observed in Kinshasa-DRC, with regard to residual transmission. HIV (Table 1).

One hundred and eighty (180) patients were selected for the study, of whom 116 (64.44%) were women; hence the sex ratio of women/men was 1.77. This female/male proportion is described in several studies carried out in the DRC and elsewhere. This is the case of the Beaume G study, conducted in 45 homozygous sickle cell children, including 30 girls (66.66%) in the pediatric department of the Monkole Hospital

**Table 1.** Study was to establish seroprevalence of HIV in the homozygous adult poly-transfused sickle cell population

Age range (years)	Men	Women	TOTAL
18-23	27 (42.18 %)	60 (51.72 %)	87 (48.33 %)
24-29	13 (20.31 %)	25 (21.55 %)	38 (21.11 %)
30-35	17 (26.56 %)	13 (11.2 %)	30 (16.7 %)
36-41	5 (7.81 %)	11 (9.48 %)	16 (8.9 %)
42-47	1 (1.56 %)	5 (4.31 %)	6 (3.33 %)
48-53	1 (1.56 %)	2 (1.72 %)	3 (1.7 %)
<b>Total</b>	<b>64 (100 %)</b>	<b>116 (100 %)</b>	<b>180 (100 %)</b>
Marital status	Men	Women	TOTAL
Singles	60 (93.75 %)	112 (96.55 %)	172 (95.55 %)
Married	3 (4.68 %)	2 (1.72 %)	5 (2.77 %)
Divorced	0 (0 %)	2 (1.72 %)	2 (1.11 %)
Widowers	1 (1.56 %)	0 (0 %)	1 (0.55 %)
<b>Total</b>	<b>64 (100 %)</b>	<b>116 (100 %)</b>	<b>180 (100 %)</b>
<b>Positive HIV</b>	7 (10.9 %)	8 (6.9 %)	15 (8.33 %)

Center in Kinshasa [8]. This study was also conducted in the city of Kinshasa, with the same demographic realities. The resemblance of the sex ratio is therefore justified; in November 2015, the Ministries of Planning and Public Health, published a report of 58.6% of women in the city of Kinshasa, with an estimated population of 11.6 million [9,10]. In addition, Alexandre L conducted a study in homozygous children with sickle cell disease in 5 countries in sub-Saharan Africa, namely Cameroon, Gabon, Ivory Coast, Mali and Senegal; there were 1,741 patients, of whom 905 (52%) were girls [11]. Natacha EM has published a study on oral manifestations, carried out on a cohort of 126 children and sickle cell patients homozygous in Cameroon; he had 65 girls (51.58%); There are others like that of Coulibaly Y and that of Josset E [12,13,14]. These studies were not conducted in the same setting, but all show that females are more affected by sickle cell disease than males. Transmission of the disease is not sex-related [15].

The age of the patients was in the range of 18 to 50 years. The most represented age group was 18 to 23 years with 87 patients (48.33%) followed by that of 24 to 29 years with 38 patients (21.11%). The median age was 29 years. These data corroborate with those of the Ngo SF study, carried out over a period of 13 years, in 129 poly-transfused sickle cell patients in the clinical hematology unit of the National Center for Blood Transfusion in Dakar; the median age was 27 years [16]. It should also be noted that sickle cell crises indicating blood transfusion may appear as early as 3 months of age and are often more serious and more frequent during early childhood and adulthood, due to the absence of fetal hemoglobin and because of the vulnerability of these patients which also increases with age [17].

The majority of patients were single. This is explained by the measures observed in the new recommendations forcing a pre-nuptial assessment in this case electrophoresis of hemoglobin, to anyone who aspires to marriage. This can be seen at all levels, from religious denominations to civil status, to families and parents. This is the result of several awareness campaigns initiated by the National Program for the Control of Sickle Cell Disease (PNLCD), aimed at reducing or even bringing to zero the number of new cases of Anemia SS in the city of Kinshasa in particular and in the DRC in general. It should be noted that in this regard, the Ministry of Public Health, through the PNLCD in partnership with REZODREPAN / SS, organized two scientific mornings on June 17 and 18, 2016, under the national theme "Tracking Women of childbearing age to fight sickle cell disease", on the occasion of the 8th World Stigma Day [18]. It was in order to sensitize the Congolese community (parents, caregivers, leaders of

religious denominations) so that all, get involved in the fight against this disease [18]. These are all measures that have made the marriage of a homozygous sickle cell subject difficult, and that of the questionable heterozygous sickle cell.

Fifteen (15) patients (8.33%) had contracted HIV. These data are opposed with those of the Batina AS study in Kisangani province, which found a seroprevalence of HIV of 0.9% (N = 1) in a population of 127 homozygous polytransfused sickle cell patients [19]. In Mali, Diarra AB published in 2013 a study carried out between November 2010 and October 2011 in 133 homozygous polytransfused sickle cell patients recruited at the Center for Research and Control of Sickle Cell Disease in Bamako; she found that HIV seroprevalence was 1% (N = 1) [20]. In our cohort, the male population appears to be more affected by the problem of transfusion safety because 10.9% of men have been infected with HIV. No published transfusion safety studies have been found in the literature; nevertheless, some, like Diarra AB, link high viral prevalence to age and not to sex; he found that homozygous sickle cell patients older than 27 years were the most concerned, with an overall incidence of HBV infection of 2.7% [20]. These results are worrying because they show that in Africa, the application of transfusion safety principles is still a problem. In a study conducted by Kabinda MJ in 2015, among 595 blood donors recruited from several blood transfusion centers in the province of South Kivu, whose goal was to establish a problem of the residual risk of transfusion of HIV and hepatitis B and C Seroprevalence of HIV in blood bags has been shown to be 4.8% [21]. Kabinda MJ, in another study conducted this time in the province of Maniema, in pregnant women with a history of blood transfusion, found that more than 15% of them had been infected with HIV [22]. All these data show the urgency of ensuring the safety of transfusion therapy.

## Conclusion

These results confirm the hypothesis that the principles of transfusion safety are not strictly applied in our environment. The seroprevalence of HIV in the polytransfused adult sickle cell population of the Center of Mixed Medicine and Anemia SS of Kinshasa is 8.33% for the interval from 2006 to 2017.

## Conflicts of interest

The authors declare no conflicts of interest.

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