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Prevalence of Anemia among People Living with HIV/AIDS Starting Antiretroviral Therapy in the Era of Dolutegravir in Kinshasa, Democratic Republic of Congo

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Abstract

Background: Anemia remains the most frequent hematological complication during HIV/AIDS infection. **Objective:** The objective of this study was to determine the prevalence of anemia among People Living with HIV (PLHIV) who start AntiRetroViral treatment in Kinshasa in the era of Dolutegravir. **Methods:** This study was a descriptive cross-sectional study to determine the prevalence of anemia in PLHIV at the start of ARV Treatment (ART) in 13 Outpatient Treatment Centers (OTC) in Kinshasa. The patient inclusion period was from October 04, 2021 to February 15, 2022. Patients included in the present study were HIV type 1 infected, ART naïve, over the age of 18 and had signed informed consent for participation. The parameters of interest were: The hemoglobin level and the clinic of the patients. **Results:** One hundred and nineteen patients were included in this work with an average age of 39.87 ± 12.36 years and extremities of 18 to 69 years. The most represented age group is that of 36 to 45 years with 37 patients (31.9%). Sixty-seven patients (56.3%) are female. The average value for Hemoglobin is 10.30 ± 2.33 g/dl. The most represented range of values is that of more than 13 g/dl with 73 patients (69.5%). Forty-nine (49) patients, or 41.5%, were in clinical stage 3. Fifty-five (55) patients, or 47.0%, had normal clinical status. **Conclusion:**

At the start of ART, 21.0% of patients presented with some form of anemia: 7.6% mild anemia, 8.6% moderate anemia and 4.8% severe anemia. About half of the patients (41.5%) were at clinical stage 3 according to WHO and more than half of all patients (47.0%) had a normal clinical condition.

Subject Areas

HIV

Keywords

Anemia, PLHIV, Start of ART, Kinshasa

1. Introduction

Human Immunodeficiency Virus (HIV) infection and Acquired Immune Deficiency Syndrome (AIDS) are currently a major public health problem worldwide. According to the United Nations Organization for the Fight against HIV/AIDS (UNAIDS) report of 2020, the number of People Living with HIV/AIDS (PLHIV) was estimated at 37.7 million [30.2 million - 45.1 million] [1]. In the same year, 1.5 million [1.0 million - 2.0 million] people were newly infected with HIV/AIDS [1]. Sub-Saharan Africa, which bears the greatest burden of the epidemic, remains to this day the most affected region in the world [1].

Anemia is a problem of reduced oxygen capacity of the blood. This decrease can be caused by: insufficient number of red blood cells available, insufficient synthesis of hemoglobin, blood loss (hemolysis), etc. Hence, these deficiencies are revealed in the laboratory results relating to hemoglobin, hematocrit and red blood cell levels. These are all products of the bone marrow. Hence anemia usually occurs when the marrow does not function normally.

Anemia remains the most frequent hematological complication during HIV/AIDS infection [2]. It affects more than three quarters of people whose HIV infection is at an advanced stage because they are not on antiretroviral therapy or because ART is not effective. It is less common in people observant of the ARV treatment. In either case, it is essential to assess anemia at the onset and during HIV infection and to treat it because inappropriate treatment can also worsen the hemoglobin level of an immune-compromised patient [2].

People with HIV/AIDS are more likely than the general population to develop anemia. Compared to those who do not develop anemia, HIV-infected people who develop anemia are more likely to die early. It is therefore important to have concrete evidence on the state of anemia already at the start of treatment.

Hence, the objective of this study was to determine the prevalence of anemia in People Living with HIV starting AntiRetroViral treatment in Kinshasa in the era of Dolutegravir.

2. Methods

2.1. Study Design, Patient and Sample Setting

The present study was a descriptive cross-sectional study aimed at determining the prevalence of anemia in People Living with HIV (PLHIV) at the start of ARV treatment (ART) in Outpatient Treatment Centers (OTC) care of PLHIV in Kinshasa. The patient inclusion period was from October 04, 2021 to February 15, 2022. Sixteen OTCs were included in the study based on their expertise and accessibility [3].

After reading and signing an informed consent in the OTC, a sample of 5 ml of blood was taken in a tube with EDTA anticoagulant from the vein of the bend of the elbow for analyzes of the hemoglobin level in any patient HIV positive by serology. The hematology analyzer (HumanCount 60TS, Human, Germany) was used in the biochemistry laboratory with specific reagents according to the manufacturer's protocol.

2.2. Study Population

The patients included in the present study were infected with HIV type 1, naïve to ART, aged over 18 years and having signed informed consent for participation.

2.3. Parameters of Interest

The parameters of interest followed for the present study were: the hemoglobin level and the clinic of the patients.

2.4. Ethical Consideration

As a whole, this study was approved by the research ethics committee of the School of Public Health, Faculty of Medicine, University of Kinshasa (ESP/CE/115/2021). Approval to access the OTC was obtained from each competent authority of the various institutions included. Prior to inclusion, fully informed consent was obtained from each patient. The samples in the OTCs were taken by the technical teams of the centers. The results of the analyses were returned to the centers concerned.

2.5. Statistical Analyzes

The analyses were carried out using SPSS software version 26 (Statistical Package for Social Sciences, IBM). Only available data were analyzed, missing data were considered completely random. Continuous variables were presented as mean ± standard deviation.

2.6. Operational Definitions

Anemia is defined as a condition in which the number of red blood cells is low. Red blood cells contain hemoglobin, a protein that allows them to carry oxygen from the lungs to all tissues in the body. It results in a hemoglobin level of less

than 10 g/dl in whole blood (mild anemia = 10 to 7 g/dl; moderate anemia = 7 to 4 g/dl; severe anemia = <4 g/dl).

3. Results

One hundred and nineteen (119) patients were included in this study according to the inclusion criteria with a mean age of 39.87 ± 12.36 years and extremes of 18 to 69 years. The most represented age group with 37 patients (31.9%) is that of 36 to 45 years; followed by those aged 26 to 35 (20.7%), those aged 46 to 55 (19.0%) and those aged 18 to 25 (16.4%).

Sixty-seven (67) patients, or 56.3%, were female while 52 (43.7%) were male, thus presenting a sex ratio of 1.29 in favor of women.

Table 1 presents the data mentioned above.

Forty-nine patients (49), or 41.5%, were at clinical stage 3; followed by 40 patients (33.9%) who were at clinical stage 1, 18 patients (15.3%) at clinical stage 2 and 11 patients (9.3%) at clinical stage 4. Fifty-five (55) patients, or 47.0%, had a normal clinical condition; 39 patients (33.3%) had a good clinical condition, 22 patients (18.8%) a poor clinical condition and 1 patient (0.9%) a pre-moribund clinical condition (Table 2).

The average value for Hemoglobin is 10.30 ± 2.33 g/dl with extreme values of 3.40 to 16.59 g/dl. The range of values most represented with 73 patients (69.5%) is that of more than 13 g/dl; followed by that of 10 to 13 g/dl (9.5%), that of 4 to 7 g/dl (8.6%), that of 7 to 10 g/dl (7.6%) and that of less of 4 g/dl (4.8%). Table 3 presents the present values.

No significant correlation was presented between the anemia and the clinic of the patients on inclusion (Table 4).

4. Discussion

The objective of this study was to determine the prevalence of anemia in People

Table 1. Distribution of the population by gender and by age group.

Parameters	Patients	
	Values	Percentage
Sex (N = 119)		
Female	67	56.3
Male	52	43.7
Age group (N = 116)		
18 - 25	19	16.4
26 - 35	24	20.7
36 - 45	37	31.9
46 - 55	22	19.0
56 - 65	11	9.5
>65	3	2.5

Table 2. Patient clinic at inclusion.

Clinic of patients	Frequency	Percentage
Clinical Stage according to WHO (N = 118)		
Stage 1	40	33.9
Stage 2	18	15.3
Stage 3	49	41.5
Stage 4	11	9.3
Clinical State of patient (N = 117)		
Normal	55	47.0
Good	39	33.3
Bad	22	18.8
Pre-moribund	1	0.9
Moribund	0	0

Table 3. Range of hemoglobin values.

Values of hemoglobin (g/dl)	Frequency $N = 105$	Percentage
<4	5	4.8
4 - 7	9	8.6
7 - 10	8	7.6
10 - 13	10	9.5
>13	73	69.5

Table 4. Correlation between the clinic of the patients and the anemia.

		Etat Clinique Patient	Stade Clinique Du Patient	Examen Biologique Du Patient
Etat Clinique Patient	Correlation de Pearson	1	.524**	-.193
	Sig. (two-sided)		.000	.051
	N	117	117	103
Stade Clinique Du Patient	Correlation de Pearson	.524**	1	-.143
	Sig. (two-sided)	.000		.149
	N	117	118	104
Examen Biologique Du Patient	Correlation de Pearson	-.193	-.143	1
	Sig. (two-sided)	.051	.149	
	N	103	104	105

**The correlation is significant at the 0.01 level (two-sided).

Living with HIV (PLHIV) who start AntiRetroViral treatment in Kinshasa during the era of Dolutegravir. One hundred and nineteen (119) ART-naïve PLHIV were included for this work according to the inclusion criteria in 16 Outpatient Treatment Centers (OTC) dispersed in the different districts of Kinshasa, Democratic Republic of Congo.

The mean age of the patients at inclusion is 39.87 ± 12.36 years with extremes of 18 to 69 years. The most represented age group with 37 patients (31.9%) is that of 36 to 45 years; followed by those aged 26 to 35 (20.7%), those aged 46 to 55 (19.0%) and those aged 18 to 25 (16.4%). These results, which present the age group of 36 to 45 years as dominant in the population, are also found in various publications on PLHIV in Kinshasa for recent years [4] [5].

Sixty-seven (67) patients, or 56.3%, were female while 52 (43.7%) were male, thus presenting a sex ratio of 1.29 in favor of women. These results, which show a predominance of the female sex in a cohort of PLHIV, are similar to the trend in relation to the sex ratio presented by various works that have been published on PLHIV for Kinshasa in recent years [4] [5].

Forty-nine patients (49), or 41.5%, were at clinical stage 3; followed by 40 patients (33.9%) who were at clinical stage 1, 18 patients (15.3%) at clinical stage 2 and 11 patients (9.3%) at clinical stage 4. Fifty-five (55) patients, or 47.0%, had a normal clinical condition; followed by 39 patients (33.3%) who had a good clinical state, 22 patients (18.8%) a bad clinical state and 1 patient (0.9%) a pre-moribund clinical state. Similar results have been found by different authors for Kinshasa [4] [5] [6]. They present a late diagnosis of patients which impacts on the care and prognosis of the follow-up of PLHIV because of the advanced stage of the infection during screening.

The average value for Hemoglobin is 10.30 ± 2.33 g/dl with extreme values of 3.4 to 16.59 g/dl. The range of values most represented with 73 patients (69.5%) is that of more than 13 g/dl; followed by that of 10 to 13 g/dl (9.5%), that of 4 to 7 g/dl (8.6%), that of 7 to 10 g/dl (7.6%) and that of less of 4 g/dl (4.8%). In the present cohort at the start of ART, 21.0% of patients presented with some form of anemia: 7.6% mild anemia, 8.6% moderate anemia and 4.8% severe anemia. It is therefore important to monitor the hemoglobin level of PLHIV already at the start of TRAV so that the latter is effective and accommodating for the patient, such as the choice of molecules to be prescribed for treatment. Previous data presented an average of 9.30 ± 2.90 g/dl in PLHIV without taking into account the duration of ART [5], and a prevalence of 55.1% in the population of adult PLHIV without taking into account clinical stages of patients [7]. These results from the literature are justifiable by the duration of treatment and the AntiRetrovirals used by PLHIV because anemia can also be caused by ARVs such as Azythromicine (AZT), as well as other antimalarial and anti-malarial drugs, Hepatitis C.

5. Conclusion

In the present cohort, at the start of ART, 21.0% of patients presented with some

form of anemia: 7.6% mild anemia, 8.6% moderate anemia and 4.8% severe anemia. About half of the patients (41.5%) were at clinical stage 3 according to WHO and more than half of all patients (47.0%) had a normal clinical condition. It is therefore important to monitor the hemoglobin level of PLHIV already at the start of ART so that the latter is effective and accommodating for the patient, such as the choice of molecules to be prescribed for treatment.

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Conflicts of Interest

The authors declare no conflict of interest for this study.

References

[1] United Nations AIDS Program (UNAIDS) (2020) Country Factsheets: Democratic Republic of the Congo. https://www.unaids.org/en/regionscountries/countries/democraticrepublicofthecongo

[2] Mocroft, A., Kirk, O., Barton, S.E., Dietrich, M., Proenca, R., Colebunders, R., Pradier, C., Arminio Monforte, A., Ledergerber, B. and Lundgren, J.D. (1999) Anaemia Is an Independent Predictive Marker for Clinical Prognosis in HIV-Infected Patients from across EUROPE. EuroSIDA Study Group. *AIDS*, **13**, 943-950. https://doi.org/10.1097/00002030-199905280-00010

[3] Losenga, O.L., Dikati, M.N., Bongenya, I.B., Ntumba, K.T., Booto, I.G., Dembo, D.R., Selenge, M.S., Nonga, E.J., Kabamba, A.C., Sombo, A.M.T., Bumoko, M.G. and Kamangu, N.E. (2022) Sociodemographic and Anthropometric Profile of People Living with Human Immunodeficiency Virus Starting Treatment in Kinshasa, Democratic Republic of the Congo. *Open Access Library Journal*, **9**, e9056. https://doi.org/10.4236/oalib.1109056

[4] Kamangu, N.E., Bulanda, I.B., Bongenia, I.B., Botomwito, T.H., Mvumbi, L.G., De Mol, P., Vaira, D., Hayette, M.-P. and Kalala, L.R. (2015) Virological Profile of Patients Infected with HIV Starting Antiretroviral Treatment in Kinshasa. *Open Access Library Journal*, **2**, e1564. https://doi.org/10.4236/oalib.1101564

[5] Mbula, M.M.K., Situakibanza, H.N.T., Mananga, L.G., Longokolo, M.M., Mandina, N.M., Mayasi, N.N., Mbula, M.M., Bepouka, B., Amaela, E.N., Tshilumba, D.N., Odio, O., Nkodila, A. and Longo Mbenza, B. (2020) Profil clinique et biologique des Personnes Vivant avec le VIH/SIDA suivies dans le Service des Maladies Infectieuses des Cliniques Universitaires de Kinshasa, République Démocratique du Congo. *Revue Malienne d'Infectiologie et de Microbiologie*, **15**, 21-29.

[6] Kamangu, N.E., Wumba, R.D.M., Situakibanza, H.N.T., Lukusa, P.T., Kapend, L.K., Mvumbi, G.L., Hayette, M.P. and Kalala, R.L. (2018) Molecular Epidemiology of Human Immunodeficiency Virus Type 1 and Therapeutic Monitoring of Patients

Treated in Kinshasa/Democratic Republic of the Congo. *International Journal of HIV and AIDS Research*, **2**, 6-11.

[7] Attinsounon, C.A., Dovonou, C.A., Alassani, C.A., Gomina, M., Agbodande, K.A., Wanvoegbe, F.A., Bokpe, R., Ahanhanzo-Glele, R., Azon-Kouanou, A. and Zannou, D.M. (2017) Prévalence et facteurs associes a l'anémie chez les adultes infectés par le VIH a l'initiation du traitement antirétroviral. *Médecine et Maladies Infectieuses*, **47**, S135-S136. https://doi.org/10.1016/j.medmal.2017.03.327

List of Abbreviations and Acronyms

ART: AntiRetroViral Treatment;

ARV: AntiRetroViral;

DRC: Democratic Republic of Congo;

DTG: Dolutegravir;

HIV: Human Immunodeficiency Virus;

OTC: Outpatient Treatment Center;

PLHIV: Person Living with Human Immunodeficiency Virus.