



Original Article

Factors Associated with Health-Related Quality of Life in Cameroonian Adolescents Living with Perinatally Acquired HIV: A Cross-Sectional Study

Facteurs Associés à la Qualité de Vie Liée à la Santé chez les Adolescents Camerounais Vivant avec le VIH périnatal : Une Étude Transversale

Francis Ateba Ndongo^{1,2,3}, Justin Ndie³, Désiré Aminou Sambo¹, Jean-Pierre Yves Awono Noah⁴, Rogacien Kana⁴, Marius Tchassep Nono⁵, Patrice Ndzie⁶, Alice Ketchaji³, Hélène Kamo¹, Mathurin Cyrille Tejiokem⁷, Emmanuelle Alexandra Hopp Biheng², Joseph Fokam⁸, Roméo Bouba Yagai⁸, Patrice Zanga Olinga³, Calixte Ida Penda⁵, Jérôme Ateudjieu³, Paul Olivier Koki Ndombo², Hubert Désiré Mbassi Awa^{2,9}, Anne Cécile Zoung-Kanyi Bissek^{3,9}, Albert Faye¹⁰, Philippe Msellati¹¹, Marc Lallemand¹²

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ABSTRACT

Introduction. In most sub-Saharan African countries, interventions in pediatric HIV had focused on the medical treatment of the disease, with little emphasis on the long-term psychosocial issues. This study aimed to explore Health-Related quality Of Life (HR-QOL) and its associated factors among Adolescents Living with perinatally acquired HIV (ALHIV) on Antiretroviral Therapy (ART) and cared of in a reference hospital in Yaounde, Cameroon. **Methodology.** This was a cross-sectional analysis of baseline data set from the IAS-CIPHER-2021/1214-ATE SMAVI study. The participants enrolled in this study were 156 ALHIV, aged 15-19 years, on ART and cared of in the CME-FCB. The World Health Organization Quality of Life (WHOQOL)-HIV-BREF was used to assess HR-QOL among the study participants. The association of exposure variables with the mean score of HR-QOL for ALHIV was assessed in univariate and multivariate analysis using linear regression. **Results.** Among the 156 participants enrolled this study, 49.4% were female. Their mean (\pm Standard Deviation) age was 17.4 (\pm 1.4) years. Most participants were having at least one parent alive (78.2%). Less than third of the participants presented with suffered from severe depression (29.5 %). The mean (\pm Standard Deviation) score of HR-QOL was 68.4 (\pm 9.6). The HR-QOL remained significantly higher only in participants with both parents alive ($p < 0.001$) and significantly lower in participants suffering from moderate or severe depression ($p < 0.001$). **Conclusion.** More care and support should be given for orphans and those with severe depression whose quality of life is significantly worse.

RÉSUMÉ

Introduction. Dans la plupart des pays d'Afrique subsaharienne, les interventions en rapport avec le VIH pédiatrique sont plus orientées vers le traitement médical de la maladie, avec moins d'importance accordée aux problèmes psychosociaux à long terme. Cette étude visait à explorer la qualité de vie liée à la santé (QdV-S) et les facteurs associés chez les adolescents vivant avec le VIH périnatal (AvVIH) sous traitement antirétroviral (TAR) au Centre Mère et Enfant de la Fondation Chantal Biya à Yaoundé au Cameroun (CME-FCB). **Méthodologie.** Il s'agissait d'une analyse transversale des données initiales de l'étude IAS-CIPHER SMAVI. Les participants à cette étude étaient 156 AvVIH âgés de 15 à 19 ans et sous TAR au CME-FCB. La QdV-S a été mesurée à l'aide du questionnaire WHOQOL-HIV-BREF de l'OMS. A l'aide des modèles de régression linéaire, l'association entre les variables d'exposition et le score moyen de QdV-S chez les AvVIH a été évaluée. **Résultats.** Parmi les 156 participants à cette étude, 49,4% étaient des filles. Leur âge moyen (\pm écart-type) était de 17,4 (\pm 1,4) ans. La plupart des participants avaient au moins un parent vivant (78,2%). Moins d'un tiers des participants souffraient de dépression sévère (29,5 %). Le score moyen (\pm écart-type) de la QdV-S était de 68,4 (\pm 9,6). La QdV-S restait significativement plus élevée uniquement chez les participants dont les deux parents étaient en vie ($p < 0,001$) et significativement plus faible chez les participants souffrant de dépression modérée ou sévère ($p < 0,001$). **Conclusion.** Il convient d'accorder davantage d'attention et de soutien aux AvVIH orphelins et aux AvVIH souffrant de dépression sévère, dont la qualité de vie est nettement moins bonne.

Affiliations

1. University of Garoua; Garoua, Cameroon
2. Chantal Biya Foundation; Yaounde, Cameroon;
3. Ministry of Public Health; Yaounde, Cameroon;
4. Media Convergence Consulting Office; Yaounde, Cameroon;
5. University of Douala; Douala, Cameroon;
6. "KidAIDS Cameroun", Yaounde, Cameroon;
7. Centre Pasteur du Cameroun; Yaounde, Cameroon;
8. National AIDS Control Committee; Yaounde, Cameroon;
9. University of Yaounde 1; Yaounde, Cameroon;
10. «Université Paris Diderot, Sorbonne Paris Cité » ; « Assistance Publique des Hôpitaux de Paris » ; «Hôpital Robert Debré, Pédiatrie Générale » ; INSERM UMR 1123, ECEVE ; Paris ; France ;
11. «Programme PACCL Site ANRS de Côte d'Ivoire » ; Abidjan, Côte d'Ivoire
12. Programs for HIV Prevention and Treatment (PHPT) Foundation – Research Institute for Sustainable Development (IRD), Paris, France.

Auteur correspondant

Ateba Ndongo Francis; POB 1936
Yaounde, Cameroon
E-mail: atebfranc@gmail.com
Telephone: +237 677330055

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HIGHLIGHTS FOR READERS IN A HURRY

What is known. Antiretroviral therapy has transformed perinatal HIV into a chronic condition. However, the focus in sub-Saharan Africa has largely been on biomedical outcomes, with less attention paid to the holistic well-being and quality of life of the growing population of adolescents living with HIV.

The problem addressed. We lack a clear understanding of what factors most significantly influence the day-to-day life quality of these adolescents, which is crucial for designing effective supportive interventions beyond medication.

What the study adds. In 156 Cameroonian adolescents with perinatally acquired HIV, we found the mean quality of life score was 68.4/100. Statistical modelling revealed that family structure and mental health were paramount. Having both parents alive increased quality of life scores, while moderate and severe depression decreased them by 6 and 12 points, respectively—these were the only factors that remained significant after controlling for others.

Implications. Holistic HIV care must actively address mental health and provide family-centered support. Routine screening for depression and dedicated counselling services, particularly for orphans, are not ancillary but essential components of care to ensure these adolescents thrive, not just survive.

INTRODUCTION

The Human Immunodeficiency Virus (HIV) infection is a viral infection that attacks the body's immune system and can lead to Acquired Immunodeficiency Syndrome (AIDS) if not treated [1]. Currently, there is no cure for HIV infection but with Antiretroviral Therapy (ART), HIV infection can be significantly controlled. With widespread availability and accessibility of ART, most children who acquired HIV infection from mother-to-child transmission can survive into, to date, at least the second decade of life [2–4]. Thus, thanks to the development of ART, HIV infection has transformed from a fatal infectious disease to a manageable chronic illness requiring long-term care [5]. However, growing-up with HIV is still challenging in various aspects, especially in the transitional period of adolescence [6]. Past experiences of HIV-related illnesses, medical interventions and the need to adhere to life-long ART may interfere with their mental development and neurocognitive functioning, as well as their overall Quality Of Life (QOL) could consequently be affected [7–17].

QOL has been defined as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns [18]. Especially, Health-Related Quality of Life (HR-QOL) is an individual's perception of their QOL in relation to health, disease, or treatment. HR-QOL is a multidimensional concept that refers to the impact of health and illness on an individual's QOL. It includes dimensions such as physical health, psychological health, social functioning, and perception of general health which encompasses not

only physical aspects but also social and emotional aspects [19].

HR-QOL is an important psychosocial outcome of health care treatment used to assess individuals' well-being susceptible to be affected by disease [20,21]. This measurement is generally used as a metric for the evaluation of effectiveness and quality of HIV care [7]. Although the HR-QOL of People Living with HIV (PLHIV) has significantly improved after ART initiation, many previous studies around the world have proven that social problems such as cultural beliefs, sociodemographic characteristics such as older age, single, low education, living in rural areas, and socioeconomic characteristics such as unemployment [22–24] can impair HR-QOL among PLHIV. Furthermore, alcohol drinking, psychological factors such as depression [25,26], clinical factors such as presence of comorbidities, HIV disease severity [2], drug-related side effects, poor adherence to ART, irregular medical follow-up, poor nutritional indices [26–28] and low Cluster of Differentiation 4 (CD4)-T cells count have been shown to be negatively associated to HR-QOL.

The afore mentioned research evidence on HR-QOL in adolescents living with HIV infection was mostly demonstrated in the Western and some Asian countries. However, this may not be the case in most sub-Saharan African countries where interventions in pediatric HIV had focused on the medical treatment of the disease, with little emphasis on the long-term psychosocial issues [29]. So, existing data on the QOL of adolescents living with HIV who are taking ART remains scarce. Thus, this study aimed to explore HR-QOL and its associated factors among Adolescents Living with perinatally acquired HIV (ALHIV) on ART and cared of in a reference hospital in Yaounde, Cameroon.

METHODOLOGY

Data source: IAS-CIPHER-2021/1214-ATE SMAVI

We conducted a cross-sectional analysis of the data base of the IAS-CIPHER-2021/1214-ATE SMAVI Study [30]. This was a randomized controlled trial which was conducted in a sample of ALHIV, on ART and cared of in a reference hospital in Yaounde, Cameroon: the “Centre Mère et Enfant de Yaoundé, Fondation Chantal Biya” (CME-FCB). The study participants had been recruited between December 2021 and March 2022. The study population was organized in an intervention arm and a control arm which were followed for 18 months. The control arm only benefited from routine care in the health facility (clinical examination, management of opportunistic infections, dispensing of antiretroviral drugs and adherence's advice). The intervention arm also benefited from routine care in the health facility and was assigned to an HIV association (KidAIDS Cameroon) in order to benefit from the reinforced support model (individualized psychological follow-up, support groups for adolescents, support groups for parents, leisure workshops, parents-adolescents-caregivers' exchange platform).

The primary outcome of this study was retention in care measured by the degree of compliance with scheduled

clinical visits. Secondary outcomes included clinical course (occurrence of AIDS classifying clinical events), adherence, mental state, QOL (monitored in ALHIV aged 15-19 years), and possibly routine viral load.

Ethical approval (CE No 2370/CRERSHC/2021) was obtained from the Centre Regional Ethics Committee for Human Health Research, Cameroon, prior to the commencement of the study.

Study design

This was a cross-sectional analysis of baseline data from the IAS-CIPHER-2021/1214-ATE SMAVI randomized controlled trial.

Study population and sample size

The participants enrolled in this study were 156 ALHIV, aged 15-19 years, enrolled in the IAS-CIPHER-2021/1214-ATE SMAVI randomized controlled trial, and who got QOL monitoring.

Data collection and measures

A structured sociodemographic, clinical, and mental (French versions of the Multidimensional Anxiety Scale for Children (MASC) [31], the Child Depression Inventory (CDI) [32], the Coopersmith Self-Esteem Inventory (SEI) [33]) questionnaire was administered to the study participants by the health care providers (nurses and physicians) in order to collect data on their sociodemographic, clinical, and mental characteristics. The World Health Organization Quality Of Life (WHOQOL)-HIV-BREF was used to assess HR-QOL among the study participants, as in previous studies conducted in people living with HIV [18,35–37].

The WHOQOL-HIV-BREF, which is a short form of the WHOQOL-HIV generic tool [38], consists of a total of 31 questions, including 2 general questions and 29 specific questions explaining six areas of QOL. The first domain, physical wellbeing, consisting of four questions, i.e. 3, 4, 14, 21; the second domain, psychological health, consisting of five questions 6, 11, 15, 24, 31; the third domain is the degree of freedom, consisting of four questions 5, 20, 22, 23; the fourth domain is social relations, consisting of four questions 17, 25, 26, 27; the fifth domain is environmental health, consisting of eight questions 12, 13, 16, 18, 19, 28, 29, 30; the sixth domain is spiritual wellness comprised of four questions 7, 8, 9, 10. Five-point Likert scale is used to develop the ratings ranging from 1 (“Very poor” / “Not at all” / “Very dissatisfied” / “Never”) to 5 (“Very good” / “Extremely” / “Completely” / “Very satisfied” / “Always”). Out of the 31 items, 7 are negative statements, for which responses were reversely coded to ensure higher scores representing better QOL. Each domain item contributes equally to the score of the domain. Each domain consisted of a different number of questions. The mean domain scale scores were determined by computing the sum of the items over the number of items answered in each domain; and this mean domain score was multiplied by 4 for the calculation of each domain score. The domain score ranged from 4 as the lowest score to 20 as the most effective score [37]. If any item on the scale was missing or unanswered, the scale score was not computed. The total score of HR-QOL

was obtained from the sum of the physical wellbeing, the psychological health, the degree of freedom, the social relations, and the environmental health scores in these domains [11], corresponding to a 0–100 scale [39]. There are no cut-off points indicating different levels of HR-QOL; higher scores indicate better HR-QOL.

Procedure

The participants for the study were recruited through their parents/guardians who were shared the information sheet explaining the purpose of the study before they provide the written parental consent. Sometimes, the information sheet and consent form were given for the adolescents to take home to parents/guardians. Those who did not wish their adolescent to participate in the study were able to withdraw their adolescent by sending back the consent form with their unwillingness indicated in it. After collecting the written parent’s/guardian’s consent and the written adolescent’s assent, the study enrolment of the adolescent was completed and data were collected from him/her using questionnaires integrated into digital tablets.

Endpoint

The main outcome variable for this study was the mean score of HR-QOL at the time of enrollment in the IAS-CIPHER - 2021/1214-ATE SMAVI randomized controlled trial. It was a continuous variable defined as the mean total score obtained from the sum of the physical wellbeing, the psychological health, the degree of freedom, the social relations, and the environmental health scales scores divided by the number of items answered in these domains, then transformed into a 0-100 scale.

Exposure variables

We considered characteristics of ALHIV at the time of enrollment in the IAS-CIPHER - 2021/1214-ATE SMAVI to identify factors associated with HR-QOL score: 1) the mental health characteristics (high or very high anxiety (MASC score ≥ 60 ; “Yes” / “No”); severe depression (CDI score ≥ 20 ; “Yes” / “No”); and low self-esteem (SEI score ≥ 10 ; “Yes” / “No”)), 2) the sociodemographic characteristics (age (as a continuous variable), gender (“Male” / “Female”), educational level (“No school attendance or primary school” / “Secondary school first cycle” / “Secondary school second cycle or high school”), functional refrigerator at home (“Yes” / “No”), television at home (“Yes” / “No”), tap water at home (“Yes” / “No”), electricity at home (“Yes” / “No”), and vital status of the parents (“None alive” / “Father only alive” / “Mother only alive” / “Both parents alive”)), and 3) the clinical characteristics (HIV status disclosure (“Not disclosed” / “Partially disclosed” / “Completely disclosed”), duration on ART (“0-10 years” / “>10 years”), and anchor antiretroviral drug (“Efavirenz or dolutegravir” / “Ritonavir-boosted lopinavir or ritonavir-boosted atazanavir”)).

Statistical analysis

In descriptive statistics analysis, ALHIV baseline characteristics were summarized by means (\pm Standard

Deviation) for continuous variables, or by counts (percentages) for categorical variables.

The association of exposure variables with the mean score of HR-QOL for ALHIV was assessed in univariate and multivariate analysis using linear regression. In univariate analysis, a simple linear regression analysis was used to assess exposure variables potentially associated with the mean score of HR-QOL. Variables with a p -value <0.2 and a priori risk factors (according to literature) were included in the multivariate linear regression analysis. The final multivariate model was built using backwards elimination, including variables with a p -value <0.2 and a priori risk factors. A p -value of less than 0.05 was considered to be statistically significant.

All statistical analyses were performed using STATA © 13.0 (Stata Corp, College Station, TX).

RESULTS

Baseline sociodemographic, clinical and mental characteristics of the study participants

Among the 156 participants enrolled this study, 49.4% were female. Their mean (\pm Standard Deviation) age was 17.4 (\pm 1.4) years (Table 1). Most participants were living in a household equipped with televisor (91.7%) or with electricity available (89.1%), attending secondary or high school (89.1%), having at least one parent alive (78.2%). Almost three-quarter of the participants were living in a household equipped with a refrigerator (76.3%), receiving efavirenz (EFV)- or dolutegravir (DTG)-based ART regimen (75.6%). Nearly half of the participants were living in a household with tap water available (51.8%), were partially disclosed about their own HIV status (49.8%), have been receiving ART for up to 10 years (55.8%). Noteworthy, less than third of the participants presented with high or very high anxiety (28.2%), suffered from severe depression (29.5 %).

Health-Related quality of life of the study participants

The mean (\pm Standard Deviation) scores of physical wellbeing, psychological health, degree of freedom, social relations, and environmental health were 14.7 (\pm 2.6), 14.4 (\pm 2.7), 14.4 (\pm 2.6), 12.9 (\pm 3.5), and 12.1 (\pm 2.4), respectively (Table 1). Noteworthy, the mean (\pm Standard Deviation) score of HR-QOL was 68.4 (\pm 9.6).

Table 1: Baseline characteristics in the whole study sample, N=156 (IAS-CIPHER - 2021/1214-ATE SMAVI, Cameroon, 2022)

Baseline characteristic	N/% or mean (\pm SD)
Female	49.4 (77)
Age in years, mean (\pm SD)	17.4 (\pm 1.4)

Educational level	
Unschooling or primary school	10.9 (17)
Secondary school first cycle	47.4 (74)
Secondary school second cycle or high school	41.7 (65)
Vital status of parents	
None alive	21.8 (34)
Father only alive	25.0 (39)
Mother only alive	16.7 (26)
Both parents alive	36.5 (57)
Household size > 6 people	39.7 (62)
Household equipped with televisor	91.7 (143)
Household equipped with refrigerator	76.3 (119)
Availability of tap water in the household	51.8 (80)
Availability of electricity in the household	89.1 (139)
Disclosure of HIV status	
Not disclosed	30.8 (15)
Partially disclosed	49.8 (113)
Completely disclosed	19.4 (28)
Duration on ART (in years)	
0-10	55.8 (87)
>10	44.2 (69)
Anchor antiretroviral drug	
EFV or DTG	75.6 (118)
LPV/r or ATV/r	24.4 (38)
High or very high anxiety	
High or very high anxiety	29.5 (46)
Severe depression	28.2 (44)
HR-QOL dimensions' scores	
Score of physical wellbeing, mean (\pm SD)	14.7 (\pm 2.6)
Score of psychological health, mean (\pm SD)	14.4 (\pm 2.7)
Score of degree of freedom, mean (\pm SD)	14.4 (\pm 2.6)
Score of social relations, mean (\pm SD)	12.9 (\pm 3.5)
Score of environmental health, mean (\pm SD)	12.1 (\pm 2.4)
Total score of HR-QOL, mean (\pmSD)	68.4 (\pm9.6)

N: Total number of subjects; n: Number of subjects in the variable category; %: Percentage; SD: Standard deviation; p : Chi-2 test; EFV: Efavirenz; DTG: Dolutegravir; LPV/r: Ritonavir-boosted lopinavir; ATV/r: Ritonavir-boosted atazanavir; ART: Antiretroviral Therapy; HR-QOL: Health-Related Quality Of Life.

Factors associated with Health-Related Quality of Life of the study participants

In the univariate analysis, the HR-QOL was significantly higher in participants who were attending secondary or high school ($p < 0.001$), with at least one parent alive ($p < 0.001$), partially or completely disclosed about their own HIV status ($p=0.013$), receiving EFV- or DTG-based ART regimen ($p=0.037$), presenting with high or very high anxiety ($p=0.027$) (Table 2). Noteworthy, the HR-QOL was significantly lower in participants who were suffering from moderate or severe depression ($p < 0.001$). When considering multivariate analysis, the HR-QOL remained significantly higher only in participants with both parents alive ($p < 0.001$) and significantly lower in participants suffering from moderate or severe depression ($p < 0.001$) (Table 2).

Table 2: Factors associated with health-related quality of life (IAS-CIPHER - 2021/1214-ATE SMAVI, Cameroon, 2022)

Baseline characteristic	Linear regression				
	n	Univariate analysis	p	Multivariate analysis	p
		N=156		N=156	
	cRC (95% CI)	aRC (95% CI)			
Gender					
Female	77	1	0.548		
Male	79	0.9 (-2.1 ; 4.0)			
Age (in years) *	156	0.7 (-0.4 ; 1.7)	0.241	0.1 (-1.0 ; 1.1)	0.859
Educational level					
Unschooling or primary school	17	1	<0.001	1	0.062
Secondary school first cycle	74	7.0 (2.1 - 12.0)		3.3 (-1.3 ; 7.9)	
Secondary school second cycle or high school	65	9.8 (4.8 ; 14.8)		5.4 (0.7 ; 10.1)	
Vital status of parents					
None alive or father only alive or mother only alive	34	1	<0.001	1	<0.024
Both parents alive	39	4.3 (0.1 ; 8.5)		3.6 (-0.1 ; 7.3)	
Mother only alive	26	6.6 (1.9 ; 11.3)		2.9 (-1.3 ; 7.1)	
Both parents alive	57	8.9 (5.0 ; 12.8)		5.6 (2.0 ; 9.2)	
Household size					
≤ 6 people	94	1	0.437		
> 6 people	62	-1.2 (-4.3 ; 1.9)			
Household equipped with television					
No	13	1	0.661		
Yes	143	1.2 (-4.3 ; 6.8)			
Household equipped with refrigerator					
No	37	1	0.560		
Yes	119	1.1 (-2.5 ; 4.7)			
Availability of tap water in the household					
No	76	1	0.808		
Yes	80	0.4 (-2.7 ; 3.4)			
Availability of electricity					
No	17	1	0.511		
Yes	139	1.6 (-3.2 ; 6.5)			
Disclosure of HIV status					
Not disclosed	15	1	0.013	1	0.258
Partially disclosed	113	6.0 (1.0 ; 11.1)		2.9 (-1.9 ; 7.7)	
Completely disclosed	28	1.5 (-4.4 ; 7.5)		0.4 (-4.7 ; 5.5)	
Duration on ART (in years) *					
0 – 10	87	1	0.435	1	0.228
> 10	69	1.2 (-1.9 ; 4.3)		1.6 (-1.0 ; 4.1)	
Anchor antiretroviral drug					
EFV or DTG	118	1	0.037		
LPV/r or ATV/r	38	3.2 (0.2 ; 7.3)			
Anxiety at baseline					
Absent or moderate	110	1	0.027		
High or very high	46	-3.7 (-7.0 ; -0.7)			
Depression					
Absent	42	1	<0.001	1	<0.001
Moderate	70	-6.2 (-9.4 ; -3.0)		-5.9 (-9.0 ; -2.9)	
Severe	44	-13.5 (-17.1 ; -10.0)		-11.6 (-15.2 ; -8.0)	

N: total number of subjects whose data were analyzed; n: Number of subjects in the variable category; 95% CI: 95% confidence interval; p: Significance level (Wald test); cRC: Crude Regression Coefficient; aRC: Adjusted Regression Coefficient; *: included in the analysis as a continuous variable; ART: Antiretroviral Therapy; EFV: Efavirenz; DTG: Dolutegravir; LPV/r: Ritonavir-boosted Lopinavir; ATV/r: Ritonavir-boosted Atazanavir.

DISCUSSION

The results of the study showed that the mean (\pm Standard Deviation) score of HR-QOL was 68.4 (\pm 9.6) in Cameroonian ALHIV aged 15-19 years old. Unfortunately, there are scarce previous studies which assessed HR-QOL among ALHIV using the WHOQOL-HIV-BREF tool. Meanwhile, this score was lower than those in previous studies surveyed among children living with HIV and aged 5-18 years old in Nigeria [11], and adolescents living with HIV and aged 13-18 years old in Thailand [4]. The dissimilarity between these studies may be firstly explained by the use of Paediatrics Quality of Life Inventory (PedsQL 4.0), different from the WHOQOL-HIV BREF tool which was the instrument utilized for measuring QOL in the current study. Secondly, the study population in the Nigerian study was expanded to younger children, compared to that of the current study. Moreover, the Nigerian children were administered a questionnaire including QOL assessment at each hospital visit, helping the clinicians to discuss emotional and psychosocial functioning [40–42]. This improved adolescents' satisfaction with care and has a positive impact on psychosocial wellbeing [42]. We therefore emphasize that monitoring of HR-QOL is an important aspect of high-quality healthcare for children and adolescents living with HIV. To optimize the use of HR-QOL monitoring, healthcare providers need to get trained in how to measure and interpret HR-QOL scores. With regards to the potential predictors of HR-QOL in HIV-positive children, the present study found that HR-QOL was significantly improved among ALHIV who had both parents alive, consistent with the findings among Vietnamese adolescents [4]. The support and positive attitude of their parents may have contributed to the improvement in their chronic health condition [43], and especially predicting higher function, QOL, and better integration into the community [44]. The present study also found that moderate or severe depression significantly impaired HR-QOL among ALHIV, consistent with the findings of a previous studies conducted in Vietnamese and Irish adult patients [26,45], and Botswanan adolescents [25]. Self-stigma and discrimination may have contributed to the development of depressive symptoms [45–47].

In this study, no significant association was found between HR-QOL and the following factors: age, gender, ART regimen, duration on ART, and educational level. In contrast with some previous studies, ART regimen and duration on ART have previously been found to predict HR-QOL [48–51]; male gender was a significant predictor of lower HR-QOL; higher educational level was a protective factor of HR-QOL [52]; older age was an independent risk factor that was negatively associated with HR-QOL in PLHIV [11]. These differences compared to the results of the present study might be due to the study population, sampling method, and measurement tools used to assess HR-QOL among studies.

There were limitations in our study that should be acknowledged. First, the study was conducted in a single city in the Center region, Cameroon. Future studies need

to be conducted in other Cameroonian regions and even nationwide to verify whether there are differences in ALHIV's HR-QOL across geographic areas. Second, we could not determine the exact causality between HR-QOL and the related factors due to the cross-sectional design. Third, our study participants were homogenous, all were living with perinatally acquired HIV in a restricted age group range of adolescence (15-19 years old). Therefore, there is a need for longitudinal research and multicenter studies expanded to younger ALHIV in order to confirm our findings and explore their causality.

CONCLUSION

This study demonstrated that more care and support should be given especially to ALHIV who are orphaned or suffer from severe depression, and whose QOL is significantly worse. The findings also emphasized the importance of regular monitoring of HR-QOL of ALHIV developing into young adulthood, as part of high-quality healthcare, requiring that healthcare providers in resource-limited settings get trained in how to measure and interpret HR-QOL scores.

LIST OF ABBREVIATIONS

- HIV: Human Immunodeficiency Virus;
- AIDS: Acquired Immunodeficiency Syndrome;
- ART: Antiretroviral Therapy;
- QOL: Quality Of Life;
- HR-QOL: Health-Related Quality Of Life;
- PLHIV: People Living with HIV;
- CD4 : Cluster of Differentiation 4 ;
- CIPHER: Collaborative Initiative for Paediatric HIV Education and Research;
- IAS : International AIDS Society ;
- CME-FCB : “Centre Mère et Enfant de Yaoundé, Fondation Chantal Biya” ;
- MASC: French versions of the Multidimensional Anxiety Scale for Children;
- CDI: Child Depression Inventory;
- SEI: Coopersmith Self-Esteem Inventory;
- WHOQOL-HIV-BREF: World Health Organization Quality Of Life-HIV-BREF;
- EFV: Efavirenz;
- DTG: Dolutegravir;
- PedsQL 4.0: Paediatrics Quality of Life Inventory 4.0.

DECLARATIONS

Ethics approval and Consent to participate

Ethical approval (CE No 2370/CRERSHC/2021) was obtained from the Centre Regional Ethics Committee for Human Health Research, Cameroon, prior to the commencement of the study. After collecting the written parent's/guardian's consent and the written adolescent's assent, the study enrolment of the adolescent was completed and data were collected from him/her using questionnaires integrated into digital tablets.

Availability of data and materials

All of the individual participant data collected during the study, after deidentification, and the study protocol will

be available, beginning 36 months following the study end (August 31, 2023), with researchers who provide a methodologically sound proposal, to achieve aims in the approved proposal. Proposal should be directed to atebfranc@gmail.com. To gain access, data requestors will need to sign a data access agreement.

Availability of data and materials

All of the individual participant data collected during the study, after deidentification, and the study protocol will be available, beginning 36 months following the study end (August 31, 2023), with researchers who provide a methodologically sound proposal, to achieve aims in the approved proposal. Proposal should be directed to atebfranc@gmail.com. To gain access, data requestors will need to sign a data access agreement.

Competing Interests

The authors have no relevant financial or non-financial interests to disclose.

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Authors' contributions

Francis Ateba Ndongo, Jean-Pierre Yves Aawono Noah, Rogacien Kana, Albert Faye, Marc Lallement, Philippe Msellati, Mathurin Cyrille Tejiokem and Marius Tchassep Nono participated in study design and conception, material preparation, data collection and analysis. The first draft of the manuscript was written by Francis Ateba Ndongo and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Authors' information

Francis ATEBA NDONGO is a Medical Doctor for Chantal Biya Foundation, Yaounde, Cameroon since 2004, and Epidemiologist for the Ministry of Public Health since 2018, and Lecturer of Public Health for the University of Garoua since 2023, and member of the Regional Ethical Committee of Research for Human Health since 2023. His research is focused on Infectious Diseases' Control, especially HIV disease, Tuberculosis, and malaria. He has a broad background in Care to People living with HIV and/or Tuberculosis, with specific training and expertise in Epidemiology and data Analysis. As Principal Investigator or Co-Investigator on several funded grants, he led the groundwork for the proposed research by demonstrating the feasibility and effectiveness of early management of HIV in infants in the underprivileged context of sub-Saharan African countries, by evaluating the feasibility of new methods of collecting biological samples with a view to implementation new

methods for diagnosing tuberculosis in children living with HIV, by measuring the effectiveness of community-based psychological support on the mental health of adolescents living with HIV, by evaluating the feasibility of control methods community-based vector control for malaria control.

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