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Mental health troubles among Cameroonian adolescents perinatally infected with Human Immunodeficiency Virus



Problèmes de santé mentale chez les adolescents camerounais infectés par le VIH par voie verticale

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A B S T R A C T

Introduction. – Adolescents living with HIV are more likely to experience mental health challenges compared to their peers who do not have HIV. However, there is a lack of data regarding the mental health of adolescents living with HIV in Cameroon. Understanding risk factors and protective factors that influence mental health amongst adolescents is critical for effective programming. The purpose of this study was to estimate the prevalence and the factors associated with depression in adolescents infected with HIV and receiving ART in a Cameroonian referral hospital.

Methods. – This was a cross-sectional study which enrolled adolescents perinatally infected with HIV, aged 10–19 years, on antiretroviral treatment and cared for at “Centre Mère et Enfant de la Fondation Chantal Biya”, Yaounde, Cameroon. Structured questionnaires, including validated French versions of the Coopersmith Child Depression Inventory (CDI), the Multidimensional Anxiety Scale for Children (MASC) and the Coopersmith Self Esteem Inventory (SEI), were administered to the study participants by the healthcare providers.

Results. – All in all, 302 adolescents were recruited in the study at a median age of 15.2 years (interquartile range : 12.0 – 17.5), including 159 (52.7 %) girls. Both parents had died for 57 (18.9 %) adolescents ; only the father was alive for 64 (21.2 %) ; only the mother was alive for 48 (15.9 %), both parents were alive for 133 (44.0 %). This study found prevalence of 26.5 % for severe depression, 36.4 % for suicidal ideation, 29.1 % for high/very high anxiety, and 20.5 % for low self-esteem. No factor was found significantly associated with severe depression but there was a trend towards decreased risk of severe depression among adolescents whose mother was alive [OR= 0.4 (0.1–1.0), p = 0.084].

Conclusion. – This study found that elevated depression, anxiety, and low self-esteem symptoms were prevalent among Cameroonian adolescents perinatally infected with HIV. Services and systems should go beyond clinical management of HIV and address the psychosocial and mental health of adolescents. The indicators of mental health among adolescents infected with HIV should be included in HIV program reporting.

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Abbreviations: HIV, Human Immunodeficiency Virus; ART, AntiRetroviral Treatment; OR, Odds Ratio; IQR, InterQuartile Range

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R É S U M É

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Introduction. – Les adolescents vivant avec le VIH sont plus susceptibles d'éprouver des problèmes de santé mentale que leurs pairs non infectés par le VIH. Cependant, il y a un manque de données concernant la santé mentale des adolescents vivant avec le VIH au Cameroun. Une meilleure connaissance des facteurs associés aux problèmes de santé mentale chez les adolescents vivant avec le VIH permettrait de renforcer l'efficacité du programme de lutte contre le VIH. Le but de cette étude était d'estimer la prévalence et les facteurs associés à la dépression chez les adolescents infectés par le VIH et sous traitement antirétroviral dans un hôpital de référence camerounais.

Méthodes. – Il s'agit d'une étude transversale qui a porté sur des adolescents infectés par le VIH par voie verticale, âgés de 10 à 19 ans, sous traitement antirétroviral au « Centre Mère et Enfant de la Fondation Chantal Biya », Yaoundé, Cameroun. Des questionnaires structurés, y compris les versions françaises validées du Coopersmith Child Depression Inventory (CDI), de l'échelle d'anxiété multidimensionnelle pour les enfants (MASC) et du Coopersmith Self Esteem Inventory (SEI), étaient administrés aux participants à l'étude par les prestataires de soins de santé.

Résultats. – Au total, 302 adolescents ont été recrutés dans l'étude à un âge médian de 15,2 ans (intervalle interquartile : 12,0 - 17,5), dont 159 (52,7%) filles. Les deux parents étaient décédés pour 57 (18,9 %) adolescents ; seul le père était vivant pour 64 (21,2 %) adolescents ; seule la mère était en vie pour 48 (15,9 %) adolescents ; les deux parents étaient en vie pour 133 (44,0 %) adolescents. Cette étude a révélé une prévalence de 26,5 % pour la dépression sévère, 36,4 % pour les idées suicidaires, 29,1 % pour l'anxiété élevée/très élevée et 20,5 % pour la faible estime de soi. Aucun facteur n'a été trouvé significativement associé à la dépression sévère, mais il y avait une tendance à la diminution du risque de dépression sévère chez les adolescents dont la mère était en vie [OR = 0,4 (0,1-1,0), p = 0,084].

Conclusion. – Cette étude a révélé que les symptômes de dépression d'anxiété et de faible estime de soi étaient fréquents chez les adolescents camerounais infectés par le VIH par voie verticale. Le système national de soins doit aller au-delà de la prise en charge clinique du VIH et intégrer la santé mentale des adolescents vivant avec le VIH. Les indicateurs de santé mentale chez les adolescents infectés par le VIH doivent être inclus dans les rapports d'activités mensuelles du programme national de lutte contre le VIH.

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1. Background

Good mental health and psychosocial wellbeing are especially important for adolescents during their transition to adulthood. They can support resilience and help to initiate healthy behaviors that shape long-term positive health outcomes. However, mental health is a neglected global health priority, particularly for children and adolescents [1,2]. Research on mental health among children and adolescents lags considerably behind that of adults, particularly in resource-limited settings [3,4].

Evidence shows that adolescents living with Human Immunodeficiency Virus (HIV) are more likely to experience mental health challenges compared to their peers who do not have HIV [5,6]. Improved access to antiretroviral therapy has helped children who were perinatally infected with HIV to survive and become adolescents. Therefore, the psychosocial well-being of these HIV-positive adolescents has become a major concern for health-care providers and policy makers. HIV-related psychosocial problems include stigma and discrimination, relationship challenges such as HIV status disclosure, difficulties with their medication, loss of biological parents in cases of orphans, denial and ambivalence towards HIV, and impeded school performance [6,7]. These psychosocial adversities predispose adolescents to poorer mental health outcomes, mostly anxiety, depression, and low self-esteem risks, which have been linked to low rates of adherence to life-saving antiretroviral treatment (ART) and retention in care [8]. Risk factors such as being female, fewer years of schooling, death within the household, poor school performance, being in a relationship with the opposite sex, non-disclosure of HIV status, severe immunosuppression, and bullying in school for taking medication have been shown to be associated with depression [9].

To date, few data are available regarding the mental health of adolescents living with HIV in resource-limited settings where most of the world's HIV-infected adolescents live, especially in Cameroon [5], which may be partially related to a lack of validated instruments for these contexts, lack of attention to or resources for mental health in resource-constrained healthcare settings, and additional stigma related to mental health conditions [10].

Moreover, measuring mental and behavioral health for adolescents remains a critical challenge that must be addressed in order for mental health to be supported and improved. Understanding risk factors and protective factors that influence mental health amongst adolescents is critical for effective programming. The purpose of this study was to estimate the prevalence and the factors associated with depression in adolescents infected with HIV and receiving ART in a Cameroonian referral hospital.

2. Methods

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

IAS-CIPHER-2021/1214-ATE SMAVI is a randomized controlled trial conducted in a sample of 302 adolescents perinatally infected with HIV, aged 10–19 years, on antiretroviral treatment (ART) and cared for in a reference hospital in Yaounde, Cameroon : "Centre Mère et Enfant de la Fondation Chantal Biya". The study participants were recruited between December 2021 and March 2022. The study population was organized with an intervention arm including 150 participants, and a control group including 152 participants. Both arms were to be followed for 18 months. The control arm only received routine care in the health facility (clinical examination, management of opportunistic infections, dispensing of antiretroviral drugs and adherence advice). The intervention arm likewise received routine care in the health facility and was assigned to an HIV association (KidAIDS Cameroon) in order to benefit from a 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, and possibly routine viral load. In addition, this study was meant to contribute to

pharmacovigilance on the neuropsychological impact (mental state) of efavirenz and dolutegravir, which are part of the regimens most often prescribed for HIV-infected adolescents.

Ethical approval was obtained from the Centre Regional Ethics Committee for Human Health Research, Cameroon, prior to the commencement of the study.

2.2. Study design

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

2.3. Study population

Adolescents enrolled in this study were perinatally infected with HIV, aged 10–19 years, on ART and cared for at “Centre Mère et Enfant de la Fondation Chantal Biya”, Yaounde, Cameroon.

2.4. Measures

A structured sociodemographic and clinical questionnaire was administered to the study participants by the health care providers (nurses and physicians) in order to collect data on their sociodemographic and clinical characteristics. Four other screening instruments were used, according to the same terms, to assess mental health in the study participants. Validated French versions of the Multidimensional Anxiety Scale for Children (MASC) [11], the Child Depression Inventory (CDI) [12], the Coopersmith Self-Esteem Inventory (SEI) [13], the Hurt, Insult, Threaten, and Scream tool (HITS) [14] and the DEP-ADO tool [15] were used to assess anxiety, depression, self-esteem, gender-based violence and psychoactive substance use respectively, among the study participants.

2.5. Procedure

The participants in the study were recruited through their parents/guardians who were shown the information sheet explaining the purpose of the study before providing written parental consent. At times, the information sheet and consent form were given to the adolescents to take home to parents/guardians. Parents/guardians 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. After collecting the parent's/guardian's written consent and the adolescent's written assent, study enrollment of the adolescent was completed and data were collected from him/her.

The data was collected using questionnaires integrated into digital tablets

2.6. Endpoint

The main outcome variable for this study was severe depression, at the time of enrollment in the IAS-CIPHER - 2021/1214-ATE SMAVI randomized controlled trial, a dichotomic variable (Yes ; No). It was defined as a score ≥ 20 (versus a score < 20) according to the Child Depression Inventory (CDI).

2.7. Exposure variables

We considered characteristics of HIV-infected adolescents at the time of enrollment in the IAS-CIPHER - 2021/1214-ATE SMAVI to identify factors associated with severe depression : age and gender of the adolescent, people living in the household, parent alive, availability of a television, HIV-positive status disclosure, school level, antiretroviral treatment duration and backbone, use of psychoactive substances, gender-based violence, anxiety.

Table 1

Baseline characteristics of the study population, $N = 302$ (IAS-CIPHER - 2021/1214-ATE SMAVI, Cameroon, 2022).

	<i>n</i>	%
Female	159	52.7
Age (years)		
10–14	146	48.3
15–19	156	51.7
Median (IQR)	15.2 (12.0 – 17.5)	
School level		
No school attendance or primary school	109	36.1
Secondary school first cycle	121	41.7
Secondary school second cycle or high school	67	22.2
Parents alive		
None	57	18.9
Father only	64	21.2
Mother only	48	15.9
Both parents	133	44.0
Household size > 6 people	125	41.4
Father living in the adolescent household	151	50.7
Mother living in the adolescent household	151	50.0
Availability of television	273	90.4
HIV+ status disclosure level		
Absent	94	31.1
Partial	58	19.2
Complete	150	49.7
ART duration (in years)		
0–10	200	66.2
> 10	102	33.8
Median (IQR)	9.4 (6.2 – 12.1)	
ART backbone		
EFV or DTG	227	75.2
NVP or LPV/r or ATV/r or DRV/r or RAL	75	24.8
High or very high anxiety	88	29.1
Severe depression	80	26.5
Suicidal ideation	110	36.4
Low self-esteem	62	20.5
Strong clinical suspicion of gender-based violence	41	13.6
Emergence or evidence of psychoactive substance use	33	10.9

N : total number of subjects ; *n* : number of subjects in the category ; % : percentage ; *IQR* : interquartile range.

2.8. Statistical analysis

The characteristics of HIV-infected adolescents at the time of enrollment in the IAS-CIPHER-2021/1214-ATE SMAVI were determined using medians with inter-quartile range (IQR) for continuous variables, and proportions for categorical variables.

The association of exposure variables with severe depression for adolescents perinatally infected with HIV was assessed in univariate and multivariate analysis using logistic regression. We included a priori risk factors in all multivariate models. Other exposure variables, with a significance level $p \leq 0.20$ in univariate analysis were entered in the initial multivariate model. The final multivariate model was built using backwards elimination, comprising a priori risk factors and other exposure variables with a significance level set at $p \leq 0.1$. We have reported odds ratios, and the 95 % confidence intervals.

All statistical analyses were performed using STATA © 13.0 (Stata Corp, College Station, TX). A p-value of < 0.05 was deemed statistically significant.

3. Results

3.1. Sociodemographic and clinical characteristics of the study population

All in all, 302 adolescents were recruited in the study at a median age of 15.2 years (interquartile range 12.0 – 17.5), including 159 (52.7 %) girls [Table 1]. Most of them (78.8 %) were not attending school or attending primary school or the first cycle of secondary

Table 2

Factors associated with severe depression among HIV-infected adolescents (IAS-CIPHER - 2021/1214-ATE SMAVI, Cameroon, 2022).

	Univariate analysis Severe depression					Multivariate analysis Severe depression		
	N	n	%	Crude OR (95 % CI)	p	Adjusted OR (95 % CI)	p	N2
Gender								302
Female	159	44	27.7	1	0.623	1	0.733	
Male	143	36	25.2	0.9 (0.5–1.5)		0.9 (0.5–1.6)		
Age (years)							0.299	
10–14	146	36	24.7	1	0.485	1		
15–19	156	44	28.2	1.2 (0.7–2.0)		1.5 (0.7–3.2)		
School level								
Unschool or primary school	109	32	29.4	1	0.680	1	0.787	
Secondary school first cycle	126	32	25.4	0.8 (0.5–1.5)		0.9 (0.5–2.0)		
Secondary school second cycle or high school	69	16	23.9	0.8 (0.4–1.5)		0.8 (0.4–1.5)		
Parents alive								
None	57	20	35.9	1	0.025	1	0.084	
Father only	64	23	35.9	1.0 (0.5–2.2)		1.1 (0.5–2.6)		
Mother only	48	7	14.6	0.3 (0.1–0.8)		0.4 (0.1–1.0)		
Both parents	133	30	22.6	0.5 (0.3–1.1)		0.6 (0.3–1.3)		
Adolescent living with father								
No	176	48	27.3	1	0.660			
Yes	126	32	25.4	0.9 (0.5–1.5)				
Adolescent living with mother								
No	151	51	33.8	1	0.716			
Yes	151	37	24.5	0.9 (0.5–1.5)				
Household size								
≤ 6 persons	177	47	26.6	1	0.976			
> 6 persons	125	33	26.4	1.0 (0.6–1.7)				
Availability of television								
No	29	8	27.6	1	0.888			
Yes	273	72	26.4	0.9 (0.5–1.9)				
Level of HIV+ status disclosure								
Absent	94	29	30.9	1	0.322	1	0.196	
Partial	58	17	29.3	0.9 (0.5–1.9)		0.5 (0.2–1.1)		
Complete	150	34	22.7	0.7 (0.4–1.2)		0.8 (0.4–1.1)		
ART duration (in years)								
0 – 10	200	51	25.5	1	0.585			
> 10	102	29	28.4	1.2 (0.7–2.0)				
ART backbone								
EFV or DTG	227	66	29.1	1	0.079	1	0.367	
NVP or LPV/r or ATV/r or DRV/r or RAL	75	14	18.7	0.6 (0.3–1.1)		0.7 (0.3–1.5)		
Anxiety								
Absent or moderate	214	47	22.0	1	0.006	1	0.117	
High or very high	88	33	37.5	2.1 (1.2–3.7)		1.6 (0.9–3.0)		
Gender-based violence								
Absent	261	65	24.9	1	0.118	1	0.896	
Strong clinical suspicion	42	15	36.6	1.7 (0.9–3.5)		1.0 (0.4–2.2)		
Psychoactive substance use								
Absent	269	68	25.3	1	0.177	1	0.471	
Emergent or evident	33	12	36.4	1.7 (0.8–3.6)		1.4 (0.6–3.3)		

N : total number of subjects in univariate analysis ; n : number of subjects in the category ; % : percentage ; 95 % CI : 95 % confidence interval ; p : Significance level (Wald global test) ; N2 : total number of subjects in multivariate analysis.

school. The majority (75.2 %) was receiving Efavirenz- or Dolutegravir-based ART. Almost two-thirds (66.2 %) of the adolescents were receiving antiretroviral treatment for no more than 10 years. A television was available in 90.4 % of the households. Both parents had died for 57 (18.9 %) adolescents ; only the father was alive for 64 (21.2 %) adolescents ; only the mother was alive for 48 (15.9 %) adolescents, both parents were alive for 133 (44.0 %) adolescents. HIV status disclosure was complete, partial or absent in 150 (49.7 %), 58 (19.2 %) and 94 (31.1 %) respectively.

3.2. Mental health issues among the study participants

Among the study participants, 110 (36.4 %) adolescents had suicidal ideation ; 88 (29.1 %) adolescents presented with high or very high anxiety ; 80 (26.5 %) suffered from severe depression ; 62 (20.5 %) had low self-esteem, 33 (10.9 %) presented with emergence

or evidence of psychoactive substance use ; and 41 (13.6 %) presented with strong clinical suspicion of gender-based violence (Table 2).

3.3. Factors associated with severe depression

When considering the univariate analyzes, having a mother alive was significantly protective against severe depression [odds ratio, 95 % Confidence Interval, significance level (Wald global test) : OR= 0.3 (0.1–0.8), $p = 0.025$] ; whilst high or very high anxiety [OR = 2.1 (1.2–3.7), $p = 0.006$] was significantly associated with higher risk of severe depression. Efavirenz- or Dolutegravir-based ART [OR=0.6 (0.3–1.1), $p = 0.079$] was associated with a trend towards increased risk of severe depression. There was no association between severe depression and adolescents' school level, gender, sex, antiretroviral treatment duration or psychoactive substance use.

At the end of the multivariate analyses, there was a trend towards decreased risk of severe depression among adolescents whose

mother was alive [OR = 0.4 (0.1–1.0), $p = 0.084$]. There was no longer an association involving the ART regimen.

4. Discussion

This is one of the first studies to assess the mental health of Cameroonian adolescents perinatally infected with HIV and who had initiated antiretroviral treatment (ART) in a referral hospital, namely the "Centre Mère et Enfant de Yaoundé", Chantal Biya Foundation, Yaounde, Cameroon. The burden of mental health issues among these adolescents was high. This study found prevalence of 26.5 % for severe depression, 36.4 % for suicidal ideation, 29.1 % for high/very high anxiety, and 20.5 % for low self-esteem. On the other hand, there was a trend towards decreased risk of severe depression among adolescents whose mother was alive.

A potential limitation in this study is related to adolescents with inappropriate reading skills who may have received an inaccurate diagnosis on the basis of their CDI score [16,17]. However, other studies highlight the overall importance of depression in adolescents living with HIV. The prevalence of 26.5 % reported for depression in the current study population was similar to the reported 18.9 % in Malawi [9,18], 25.0 % in Rwanda [17], and 17.8 % in Kenya [19]. The prevalence of 36.4 % for suicidality reported in the current study was even higher than the 30.5 % reported in a Ugandan study [20]. Depression and suicidality are important co-morbidities in adolescents infected with HIV, and they have been linked to faster disease progression and increased morbidity and mortality. Failure to identify and address these issues may prevent adolescents from successfully coping with their illness or adhering to antiretroviral treatment [21].

In the current study, the prevalence of 29.1 % reported for anxiety was comparable to the rate of 24.0 % reported in a previous review [22] and the reported 32.3 % in Kenya [19]. Association between depression and anxiety among adolescents infected with HIV has seldom been mentioned in previous studies [9,23]. In these HIV-infected adolescents, according to previous studies, depression and anxiety symptoms were associated with lower adherence to antiretroviral treatment [24,25], as well as higher substance abuse and risky sexual behaviors [26]. Anxiety in adolescents with HIV worsened their condition, leading to a negative impact on behavior, low medication compliance, school and learning challenges, poor self-care and low social function [27].

This study showed that among more than half of HIV-infected adolescents, at least one biological parent was dead. Previous studies had demonstrated that adolescents with HIV infection had usually experienced loss in their family and that many of them lived with a single parent and had experienced multiple caretaking transitions due to parental death ; some may have been living with relatives, in foster care, or in an orphanage [28]. Loss of a parent, especially the mother, is one of the significant stressors related to poor mental health outcomes [28] ; it is likely to negatively affect family functioning, which basically refers to the ability to cope with stress, resolve conflicts, and coordinate between members. Family functioning also involves the relationships, affects, and behaviors of family members. Poor family functioning has been associated with more pronounced child disability [29]. On the contrary, the current study showed a trend towards decreased risk of severe depression among adolescents whose mother was alive, and who were consequently presumed to benefit from better family functioning.

5. Conclusion

This study found that elevated depression, anxiety, and low self-esteem symptoms were prevalent among Cameroonian adolescents perinatally infected with HIV. It indicated the need to address mental health within care systems addressing HIV among teenagers.

Provision of mental health support is integral to HIV care. Linking adolescents to more specialized mental health services through facility-specific or locally-tailored referral networks may be important in certain cases. Services and systems should go beyond clinical management of HIV and address the psychosocial and mental health of adolescents. Indicators of mental health should be regularly included in reporting.

Ethics approval and consent to participate

The IAS-CIPHER-2021/1214-ATE SMAVI randomized controlled trial was granted ethical approval in Cameroon by the Regional Ethics Committee of the Centre Region, Cameroon. Parents/guardians signed written informed consent and participants provided assents for participation in the study.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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No funding was provided for this study.

Authors' contributions

FAN participated in the study design and conception, the recruitment and follow-up of HIV-infected adolescents, the data analysis and the manuscript writing. **RK** participated in the study design and conception, the data analysis and the manuscript writing. **MTN** participated in the study design and conception, the recruitment and follow-up of HIV-infected adolescents, the data analysis and the manuscript writing. **JPYAN** participated in the study design and conception, the recruitment and follow-up of HIV-infected adolescents, the data analysis and the manuscript writing. **PN** participated in the study design and conception, and the manuscript writing. **MCT** participated in the study design and conception, and the manuscript writing. **EHB** participated in the recruitment and follow-up of HIV-infected adolescents. **JN** participated in the study coordination. **TAN** participated in the study coordination. **AK** participated in the study coordination. **PBP** participated in the study coordination. **CIP** participated in the manuscript writing. **ACZKB** participated in the study coordination. **POKN** participated in the study coordination. **HBH** participated in the study design and conception. **ML** participated in the study design and conception, and the manuscript writing. **AF** participated in the study design and conception, and the manuscript writing.

Competing interests

The authors have no conflicts of interest relevant to this article to disclose.

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