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Quality of life among adolescents living with HIV receiving care at CIRBA, Côte d'Ivoire: A Pilot Study

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Abstract

In Côte d'Ivoire, adolescents living with HIV constitute a vulnerable population whose quality of life remains poorly documented. The aim of this study was to assess the quality of life of HIV- positive adolescents receiving care at the Centre Intégré de Recherches Biocliniques d'Abidjan (CIRBA) and to identify its determinants. A pilot, cross-sectional, descriptive and analytical study was conducted among 32 adolescents aged 10 to 17 years receiving care at CIRBA in Abidjan. Quality of life was measured using the PedsQL™ HIV questionnaire. Spearman's, Mann-Whitney, Kruskal-Wallis and Fisher's correlation tests were used to establish links between the various parameters. The results showed a predominance of females (65.6%) with a mean age of 14.1 ± 2.1 years. The school enrolment rate was high (96.9%). These adolescents lived either with their families (53.1%) or in an institution (Centre Espoir) (46.9%). Their overall quality of life was high (80.3 ± 4.1), with good scores in the treatment-related and psychosocial dimensions (≥ 82). In contrast, the understanding/communication dimension was significantly lower (52.6 ± 15.5), whilst the dimension related to HIV symptoms was moderate (65.7 ± 11.9). Analysis of associations showed that treatment adherence was significantly higher at the Centre Espoir than in a family setting ($p = 0.018$). Age was negatively correlated with understanding/communication ($\rho = -0.40$; $p = 0.023$), whilst the duration of antiretroviral treatment was positively associated with perception of treatment ($\rho = 0.40$; $p = 0.025$) and overall quality of life ($\rho = 0.41$; $p = 0.020$). No significant association was observed with gender, educational level or type of antiretroviral regimen ($p > 0.05$).

Keywords: Quality of life; HIV; Adolescents; Therapeutic education; Côte d'Ivoire; CIRBA

1. Introduction

Infection with the human immunodeficiency virus (HIV) remains a major public health problem in sub-Saharan Africa [1]. In 2019, this region accounted for approximately 90% of the 1.8 million adolescents living with HIV worldwide [2, 3]. Adolescents living with HIV constitute a particularly vulnerable population due to the dual challenges of adolescence and managing a chronic illness. In West Africa, adolescent girls face a higher risk of infection than boys of the same age, reflecting persistent inequalities [3]. Furthermore, expanded access to antiretroviral treatment has transformed HIV into a manageable chronic condition, significantly improving the prognosis for infected children [4, 5]. However, adolescents living with HIV face challenges related to the changes of adolescence, stigma and the need for lifelong treatment, which can impact their quality of life [6, 7]. Quality of life, defined as an individual's perception of their place in life within the context of their cultural environment and values [8], remains largely intact among adolescents on treatment, although certain aspects may be affected, particularly the physical, social and emotional dimensions [9]. However, the data available in sub-Saharan Africa, particularly in Côte d'Ivoire, remain limited. Although the prevalence

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of HIV is estimated at 2.1% among people aged 15 to 49, with approximately 8,000 adolescents living with HIV, few studies have assessed their quality of life using validated instruments. This study therefore aims to address this gap by assessing the quality of life of HIV-positive adolescents receiving care at the Centre Intégré de Recherches Biocliniques d'Abidjan (CIRBA) and identifying its determinants.

2. Methodology

2.1. Type and setting of the study

This is a descriptive and analytical cross-sectional pilot study. It was conducted at the Centre Intégré de Recherches Biocliniques d'Abidjan (CIRBA) in Abidjan and the Centre Espoir, Grand-Bassam, Côte d'Ivoire. CIRBA is a centre of excellence for paediatric HIV care, providing follow- up for over 200 HIV-positive children and adolescents.

2.2. Study period and population

The study ran from November 2025 to January 2026. It involved 32 adolescents with confirmed HIV infection.

2.3. Sampling and selection of subjects

The size of the study population was determined based on all adolescents aged 10 to 17 years, totalling 214 subjects, who were being monitored at the Centre for Integrated Care and Biomedical Research in Abidjan (CIRBA) for confirmed HIV infection. From this population, participants were selected according to the following inclusion and exclusion criteria:

Inclusion criteria: Adolescents aged 10 to 17 years, with documented HIV seropositivity, receiving regular follow-up at CIRBA or the Centre Espoir, on antiretroviral treatment for at least six (6) months, and who had given their informed consent as well as that of their legal guardian, were included.

Exclusion criteria: Adolescents with documented severe psychiatric comorbidities, who had been hospitalised within the previous four (4) weeks, or who were unable to understand and respond to the questionnaire, were excluded.

In total, out of a source population of 214 eligible adolescents, 32 were included in the study, representing a participation rate of 16.5%. All data collected were complete (100% complete data).

2.4. Survey

This study required a cross-sectional survey. Data collection was carried out using face-to-face questionnaires. The information gathered covered sociodemographic and clinical variables, as well as data on the adolescents' quality of life.

2.5. Variables studied

The sociodemographic variables collected included: age, sex, educational level, and accommodation type (Centre Espoir vs family home). The clinical variables included: duration of ARV treatment, current ARV regimen, and most recent HIV viral load, with viral suppression defined as a viral load <50 copies/mL [10].

2.6. Quality of life measurement tool

Quality of life was assessed using the PedsQL™ 3.0 HIV Module, a validated instrument specifically designed to measure health-related quality of life in children and adolescents living with HIV [11]. This module comprises 34 items divided into 7 dimensions: i) HIV-related symptoms (7 items), ii) Antiretroviral (ARV) treatment (5 items), iii) Adherence/Compliance (4 items), iv) Emotional functioning (5 items), v) Social functioning (5 items), vi) School functioning (5 items), and vii) Understanding/Communication (3 items).

Items are scored on a scale of 0 to 100 (higher score = better QoL). The overall QoL score corresponds to the mean of the 34 items. Scores were categorised as follows: good QoL (≥70), average (50–69), poor (<50), in accordance with the recommended thresholds.

2.7. Statistical analyses

Continuous variables were described using means ± standard deviations and medians [interquartile ranges], after checking for normality using the Shapiro-Wilk test. Categorical variables were presented as frequencies and

percentages. For bivariate analyses, correlations between continuous variables were assessed using Spearman's correlation coefficient (ρ), with the strength interpreted as follows: $|\rho|<0.3$ weak, $0.3\leq|\rho|<0.7$ moderate, $|\rho|\geq0.7$ strong [12]. Comparisons of scores between two independent groups used the Mann-Whitney test. Comparisons between three or more groups were performed using the Kruskal-Wallis test. Associations between categorical variables were tested using Fisher's exact test, with calculation of odds ratios (OR) and 95% confidence intervals (95% CI). The threshold for statistical significance was set at $p<0.05$. All analyses were performed using Python 3.12.

3. Results

3.1. Sample characteristics

Table 1 shows that the final sample comprised 32 adolescents, including 21 girls (65.6%) and 11 boys (34.4%), with a sex ratio of 0.52. The mean age was 14.1±2.1 years [11–17 years], with 19 participants (59.4%) in the 10–14 age group and 13 (40.6%) in the 15–17 age group. The school attendance rate was very high (96.9%, n=31), with 40.6% of participants having completed secondary education. Accommodation was divided between the Centre Espoir (46.9%) and the family home (53.1%). No risky behaviour was recorded.

Table 1 Sociodemographic characteristics of the study population (N=32)

Characteristics	n / Mean ± SE	%
Gender		
Male	11	34.4
Female	21	65.6
Sex ratio	0.52	
Age (years)	14.1 ± 2.1 [11-17]	
Age group		
10-14 ans	19	59.4
15-17 ans	13	40.6
Level of education		
Not in education	1	3.1
Apprenticeship	1	3.1
Primary	7	21.9
Secondary 1st level	13	40.6
Secondary 2nd level	10	31.2
Accommodation type		
Centre Espoir	15	46.9
Host family	17	53.1
Risky behaviour		
Tobacco use	0	0
Alcohol consumption	0	0

3.2. Characteristics of antiretroviral treatment

Table 2 shows that the average duration of ARV treatment was 9.2 ± 4.0 [2–17] years, with 40.6% of participants having been treated for 11–20 years. The mean viral load was 26.8 ± 16.6 [1–76] copies/mL. Viral suppression (<50 copies/mL) was achieved in 93.8% of participants (n=30/32). All participants were receiving a dolutegravir (DTG)-based regimen:

ABC- r 3TC-DTG (n=24; 75.0%) or TDF-3TC-DTG (n=8; 25.0%). Self-reported adherence was excellent in 100% of participants.

Table 2 Antiretroviral treatment characteristics (N=32)

Caractéristics	n / Mean ± SE [Min - Max]	%
Duration of ARV treatment (years)	9.2 ± 4.0 [2 - 17]	
Time since starting ARV		
≤ 5	7	21.9
6–10	12	37.5
11–20	13	40.6
HIV viral load (copies/mL)	26.8 ± 16.6 [1 - 76]	
Viral suppression (<50 copies/mL)	30	93.8
Current ARV regimen		
ABC 3TC DTG	24	75.0
TDF 3TC DTG	8	25.0
Adherence to ARV treatment		
Excellent	32	100.0

3.3. Overall quality of life and by dimension

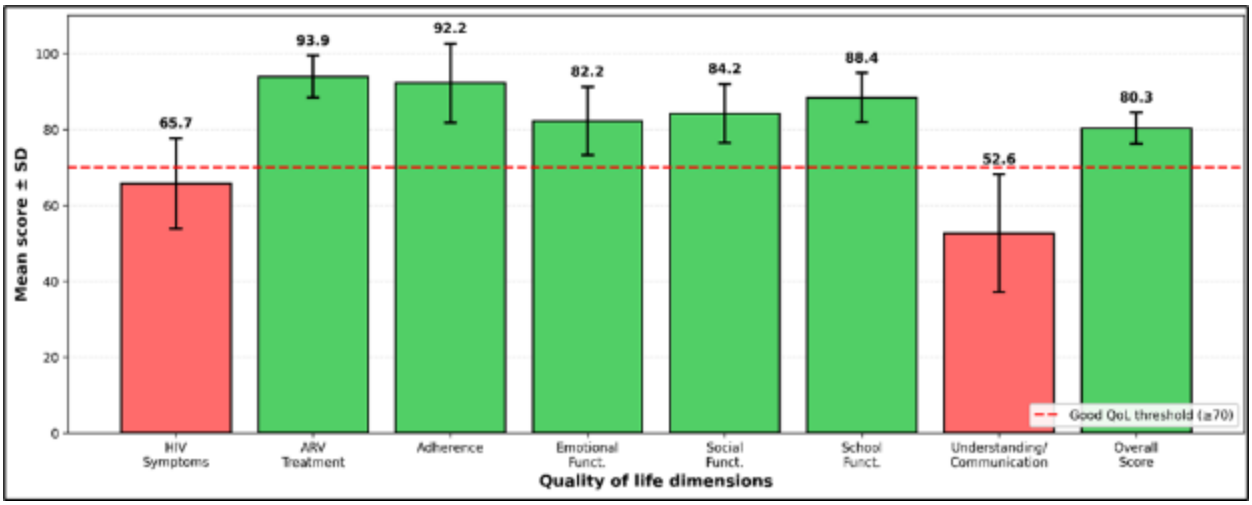

Figure 1 Mean quality of life scores by dimension

Figure 1 shows the mean quality of life scores by dimension. The adolescents had a good overall quality of life score (80.3 ± 4.1), with treatment-related dimensions being remarkably high: adherence/compliance (92.2 ± 10.4) and ARV treatment (93.9 ± 5.5), where 90.6% to 100% of participants achieved a good level (≥70). Psychosocial dimensions were also well maintained, with 90.6% of adolescents reporting good emotional (82.2 ± 9.0), social (84.2 ± 7.7) and academic (88.4 ± 6.5) functioning. In contrast, the comprehension/communication dimension was severely impaired (52.6 ± 15.5), with only 9.4% of adolescents achieving a good level. The HIV-related symptoms dimension showed moderate quality of life (65.7 ± 11.9), with less than half of participants having good QoL (46.9%).

3.4. Associations between parameters and quality of life dimensions

Analysis of associations between sociodemographic/clinical parameters and QoL dimensions (Table 3) revealed four significant associations. Adherence to ARV treatment was significantly higher at the Centre Espoir compared to the home setting (p=0.018). Age showed a moderate negative correlation with understanding/communication (ρ=-0.40, p=0.023), suggesting that understanding decreases with age. Duration of ARV treatment was positively correlated with perception of treatment (ρ=0.40, p=0.025) and the overall QoL score (ρ=0.41, p=0.020). No significant associations were detected for gender, educational attainment or ARV regimen (all p>0.05).

Table 3 Associations between parameters and dimensions of quality of life

Parameters	**Symptoms HIV**	**Treatment ARV**	**Adherence**	**Emotional functioning emotional**	**Social Social**	**School Academic**	**Comprehension/ Communication**	**Overall score QdV**
Gender	p=0.136 ns	p=0.532 ns	p=0.919 ns	p=0.704 ns	p=0.291 ns	p=0.916 ns	p=0.622 ns	p=0.720 ns
Age	ρ=-0.09 p=0.629 ns	ρ=0.09 p=0.640 ns	ρ=-0.09 p=0.631 ns	ρ=-0.05 p=0.787 ns	ρ=0.10 p=0.605 ns	ρ=0.00 p=0.999 ns	ρ=-0.40 p=0.023 *	ρ=-0.11 p=0.548 ns
Education	p=0.542 ns	p=0.961 ns	p=0.145 ns	p=0.564 ns	p=0.338 ns	p=0.416 ns	p=0.101 ns	p=0.400 ns
Type of accommodation	p=0.954 ns	p=0.148 ns	p=0.018 *	p=0.148 ns	p=0.579 ns	p=0.936 ns	p=0.838 ns	p=0.384 ns
Duration of ARV	ρ=0.11 p=0.564 ns	ρ=0.39 p=0.025 *	ρ=0.28 p=0.129 ns	ρ=0.19 p=0.291 ns	ρ=0.06 p=0.758 ns	ρ=0.22 p=0.233 ns	ρ=0.29 p=0.108 ns	ρ=0.43 p=0.014 *
ARV protocol	p=1.000 ns	p=0.150 ns	p=0.703 ns	p=0.563 ns	p=0.539 ns	p=0.926 ns	p=0.466 ns	p=0.794 ns

Note: Statistical tests: Spearman's correlation (Age, Duration of ARV treatment), Mann-Whitney U (Gender, Type of accommodation, ARV protocol), Kruskal-Wallis (Education: primary/secondary/sixth form). ρ = Spearman's correlation coefficient. Significance thresholds: *** p<0.001; ** p<0.01; * p<0.05; ns = not significant. Highlighting: dark orange (p<0.001), medium orange (p<0.01), yellow (p<0.05). ⭐ Light green = Adherence to accommodation mode (p=0.018*, key result). CE = Centre Espoir; ARV = Antiretroviral; ABC = Abacavir; TDF = Tenofovir; DTG = Dolutegravir. N/A = test not applicable (insufficient sample size).

4. Discussion

The aim of the study was to assess the quality of life of HIV-positive adolescents followed at the Centre Intégré de Recherches Biocliniques d'Abidjan (CIRBA) and to identify its determinants, with a particular focus on schooling and age.

The results revealed a predominance of females in the sample (65.6%), consistent with the epidemiology of mother-to-child transmission of HIV in sub-Saharan Africa [4, 13]. Furthermore, the school enrolment rate observed was particularly high (96.9%), contrasting favourably with national data for Côte d'Ivoire, estimated at 47.5% [14], and far exceeding those reported in other African studies among adolescents living with HIV (75–85%) [15, 16]. These results suggest the effectiveness of CIRBA's holistic care model, which integrates medical, psychosocial and educational support.

The complete absence of reported risk behaviours (smoking, alcohol consumption, sexual activity), whilst encouraging, must be interpreted with caution. This observation could be partly explained by a social desirability bias, frequently reported in face-to-face surveys of African adolescents, where anonymised data collection methods tend to reveal significantly higher prevalence rates, which may be two to three times higher [17, 18]. Furthermore, the relatively young age of the cohort, which is lower than that generally associated with the onset of such behaviours in West Africa (15–16 years), is a plausible explanatory factor [19]. Finally, it is also possible that the structured care framework and the psychosocial support provided positively influence the reported behaviours, without ruling out under-reporting.

With regard to the characteristics of antiretroviral treatment, the high rate of viral suppression observed (93.8%), combined with the systematic use of dolutegravir (100%), reflects alignment with the 2019 WHO recommendations. This level of performance exceeds not only the targets of the UNAIDS 95-95-95 programme [13], but also the averages reported in sub-Saharan Africa (85– 88%) [5]. Furthermore, the excellent self-reported treatment adherence (100%) is corroborated by this near-universal level of viral suppression, suggesting a concordance between participants' statements and biological data, despite the potential bias of social desirability [20].

Regarding quality of life, the results indicate a high overall level (80.3 ± 4.1), with 96.9% of participants scoring ≥ 70, in line with recent studies showing that adolescents living with HIV on effective antiretroviral therapy and receiving structured psychosocial support can achieve quality of life levels comparable to those of their HIV-negative peers [21]. Dimensions related to treatment (adherence: 92.2; perception of treatment: 93.9) as well as psychosocial dimensions (emotional: 82.2; social: 84.2; academic: 88.4) appear to be particularly well maintained. However, a marked deficit is observed in the understanding/communication dimension (52.6 ± 15.5), with only 9.4% of participants achieving a score of ≥ 70, thus constituting a major vulnerability. This disconnect between excellent treatment adherence (100%) and a low level of understanding suggests the phenomenon of 'blind adherence', previously described in Thai and Zambian contexts, where adolescents adhere correctly to treatment without fully understanding the implications [22, 23]. Such a situation raises concerns regarding patient empowerment and the success of their transition to adult care services.

With regard to the associations observed, the significantly higher adherence at the Centre Espoir ($p = 0.018$) is consistent with studies conducted in Uganda and Kenya, reporting rates of 96–98% in institutional settings compared with 83–88% in family settings. This difference is generally attributed to direct supervision of treatment and adherence to fixed schedules [24]. However, these results do not justify the systematic institutionalisation of adolescents, as multi-component family- based interventions such as SMS reminders, home visits or adherence clubs have demonstrated their ability to achieve comparable levels of adherence, whilst preserving the developmental benefits associated with the family environment [25, 26].

The paradox of a decline in understanding with age ($\rho = -0.40$; $p = 0.023$) is consistent with observations reported in Thailand and Zambia, where a decline in levels of understanding was described, falling from 77% to 61% between the ages of 12 and 17 [27]. This trend may reflect a mismatch in educational programmes, which are often designed for younger children and insufficiently adapted to the specific needs of adolescents, particularly regarding sexuality, reproduction and empowerment.

Furthermore, the beneficial effect of the duration of antiretroviral treatment on perceptions of treatment and overall quality of life is part of a process of gradual adaptation to chronic illness, characterised by becoming familiar with treatment, improved tolerance of side effects, and the accumulation of positive experiences of virological control. This phenomenon has been documented in Kenyan longitudinal cohorts, showing an improvement in quality of life scores from 72.3 to 78.6 over a five-year period.

The lack of a significant association with gender contrasts with the literature, which generally reports increased vulnerability among girls [28]. This discrepancy could be explained either by the effectiveness of equitable psychosocial support within the care setting, or by limited statistical power due to the small sample size (n = 32), which may not detect small differences. Furthermore, the lack of difference between the ABC-3TC-DTG and TDF-3TC-DTG treatment regimens is consistent with the results of paediatric clinical trials, which show comparable virological efficacy and tolerability when these combinations are used with dolutegravir, thereby helping to simplify treatment algorithms [29].

Limitations of the study

Several limitations must be taken into account when interpreting these results. The small sample size (n=32) limits statistical power. Selection bias is a possibility, as the volunteers may have a better quality of life than those who did not participate. The age-comprehension paradox would require longitudinal confirmation to rule out a cohort effect. Finally, the absence of a control group of HIV-negative adolescents prevents the specific effect of HIV from being isolated from the general socio-economic and cultural factors affecting Ivorian adolescents.

5. Conclusion

This study shows that adolescents living with HIV followed at CIRBA have a generally high quality of life, supported by good antiretroviral care, excellent adherence and near-optimal viral suppression. However, shortcomings persist, notably in understanding and communication regarding the disease, particularly as they grow older . These findings highlight the need to strengthen age-appropriate therapeutic education interventions to promote greater empowerment among adolescents and improve their transition to adult care. Larger-scale studies are needed to confirm these observations and better guide management strategies.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that they have no conflicts of interest in relation to this article.

Statement of ethical approval

This study was approved by the National Ethics Committee for Life Sciences and Health (CNESVS) of Côte d'Ivoire under number 0007625/MSHPCMU/CNESVS-km.

Statement of informed consent

Written informed consent was obtained from all legal guardians and assent from the adolescent participants prior to inclusion in the study. The confidentiality and anonymity of participants were strictly maintained throughout the research.

Authors' contributions

PHJC: Investigation, data collection, formal analysis, drafting of the original manuscript. YAH: Conceptualisation, methodology, validation of analyses, revision of the manuscript. TTd'A: Supervision, validation, revision of the manuscript. KK: Supervision of investigations, revision of the manuscript. AAAL: Academic supervision, conceptualisation, revision of the manuscript. CH: Validation of the study, revision of the manuscript. All authors have read and approved the final version of the manuscript.

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