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Adherence to antiretroviral treatment in children at the Center of Excellence for the care of people living with HIV/AIDS at the University of Lubumbashi in the Democratic Republic of Congo

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Abstract

Introduction: Treatment adherence among children living with HIV is a major challenge in sub-Saharan Africa. In the Democratic Republic of Congo, pediatric antiretroviral therapy coverage remains low, with marked disparities related to sex, parental status, and age.

Methodology: A retrospective descriptive study was conducted at the Center of Excellence of the University of Lubumbashi, covering 158 medical records of children aged 2 to 14 years under ARV treatment between 2015 and 2020. Sociodemographic, clinical and virological variables were analyzed, and statistical tests (chi-square, Student, multivariate regression) were used to identify the determinants of adherence.

Results: The study revealed treatment interruption in 19% of cases, more frequent in boys (21.1%) and in children with undetermined parental status (33.3%). Adolescent girls (11–15 years) were overrepresented (43%) but had better viral suppression. Conversely, boys showed a higher prevalence of detectable viral loads. The absence of virological data correlated with a more frequent treatment interruption (33.3%), reflecting possible undocumented losses to follow-up or deaths.

Conclusion: Pediatric treatment adherence is influenced by complex factors, including gender, psychosocial context, and follow-up regularity. Gender-differentiated interventions, supported by community programs, are essential to improve retention in care and ensure long-term therapeutic effectiveness.

Keywords: Treatment Adherence; Pediatric HIV; Treatment Adherence; Treatment Interruption; Parental Status

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1. Introduction

1.1. General context

Adherence to treatment is a fundamental issue in the management of chronic diseases, particularly for children with HIV/AIDS. Adherence to ARV (antiretroviral) treatment not only reduces HIV-associated morbidity and mortality, but also limits the risk of disease transmission. However, adherence to treatment in children presents unique challenges, including drug side effects, the complexity of taking treatment, strict schedules, and the role of parents or guardians, which strongly influence adherence [11].

1.2. Statistics and epidemiology

According to UNICEF data from 2022, more than 2.5 million children and adolescents are living with HIV, the majority of them residing in sub-Saharan Africa [2]. Unfortunately, only 57% of children aged 0-14 living with HIV are receiving ARV treatment compared to 77% of adults. In the DRC, approximately 520,000 people are living with HIV, including 68,000 children under 14 years old. However, only 25% of them are on treatment, and the Lubumbashi region, despite having a high prevalence, is still not meeting the needs in terms of care and remains largely unmet [14].

Studies in South Africa, by Hendrickson et al. 2019, have shown that orphaned children are at higher risk of treatment non-adherence, which is reflected in detectable viral loads [12]. In Asia, Buvuhuy et al. 2016 found similar survival between orphans and non-orphans on ART, but noted an increased risk of delayed treatment initiation among orphaned children [13]. In the DRC, a study by Tshikwej Ngwej et al. 2020 in Lubumbashi observed that treatment failure is often associated with children over 10 years of age [14].

1.3. Problematic

Despite advances in access to ARV treatment for children living with HIV, treatment remains limited, particularly in the DRC, where a low percentage of children receive treatment. Furthermore, orphaned children appear to be particularly vulnerable to treatment adherence, highlighting gaps in current treatment strategies. In a context where socioeconomic, cultural, and psychological factors directly influence adherence, it is necessary to understand the specific determinants.

So the question that arises is:

What are the specific factors that influence therapeutic adherence of children on ARV treatment, particularly among orphans, and what strategies should be implemented to improve care at the Center of Excellence of the University of Lubumbashi?

1.4. Objective

This study aims to assess the therapeutic adherence of children on ARV treatment followed at the Center of Excellence of the University of Lubumbashi and to identify the factors that influence adherence, particularly among orphaned children, to enable the development of strategies to improve care.

2. Methodology

This retrospective descriptive study was carried out on 158 medical records of children undergoing ARV treatment at the Lubumbashi Center of Excellence, over a period from 2015 to 2020, whose ages ranged from 2 to 14 years and they were without distinction of sex.

This cohort includes children monitored regularly with a regularity criterion based on quarterly or monthly consultations.

2.1. Inclusion and exclusion criteria

Children included in this study were those under 14 years of age, on ARVs, and with complete medical records. Children with incomplete records or who were not regularly monitored during the study period were excluded.

2.2. Data collection

Data were collected from a previously established and closely tested survey form. Variables collected included sex, age, parental status, growth, treatment interruptions, and viral loads, defining the complete record. Information was extracted from the Center of Excellence database and verified for accuracy.

2.3. Analysis methods

Statistical analyses were performed to assess differences in adherence by sex, parental status, and other key variables. Chi-square and Student's t-tests were used to compare orphaned and non-orphaned groups. Multivariate analysis was also performed to identify factors associated with undetectable viral load.

3. Results

3.1. Distribution by Age and Gender

Table 1 Distribution of study participants by age group and gender

Age group	Female	Male	TOTAL	% F	% M	% Total
0-5 years	5	7	12	3.2%	4.4%	7.6%
6-10 years old	28	18	46	17.7%	11.4%	29.1%
11-15 years old	68	32	100	43.0%	20.3%	63.3%
TOTAL	101	57	158	63.9%	36.1%	100%

Marked female predominance (63.9%), especially among 11-15 year-olds (43% of the total). Peak vulnerability among adolescent girls (11-15 years), reflecting specific challenges (compliance, stigma). Under-representation of 0-5 year-olds (7.6%), possibly linked to late screening or early mortality.

3.2. ART Discontinuation by Sex

Table 2 ART discontinuation according to sex

Sex	Interruption (YES)	% YES	Interruption (NO)	% NO	Total	GOLD
F	18	17.8%	83	82.2%	101	0.92 [0.38 – 1.76]
M	12	21.1%	45	78.9%	57	
Total	30	19.0%	128	81.0%	158	1.13 [0.53 - 2.41]

Boys are at greater risk of termination (21.1% vs. 17.8% for girls), despite their low proportion (36.1% of the cohort). Less adherence to care, early economic responsibilities, or less parental involvement. Overall termination rate is worrying (19%), requiring targeted interventions.

3.3. ART Interruption by Parental Status

Table 3 ART discontinuation according to parental status

Parental Status	Total	Interruption (YES)	% Interruption	GOLD
Two parents	60	9	15.0%	
Single mother	24	3	12.5%	0.81 [0.20-3.2]
Single father	35	7	20.0%	1.41[0.47-4.2]
Single father	15	0	00.0%	
Status undetermined	24	8	33.3%	2.82[0.93-8.5]

Undetermined parental status = maximum risk (33.3% interruption), highlighting the importance of family monitoring. Resilient orphans (0% interruption): possible effect of support programs for vulnerable children. Single fathers less protective (20% vs. 12.5% for single mothers), reflecting disparities in care.

3.4. Interruption of ART by Viral Load

Table 4 ART discontinuation according to viral load status

Viral Load	Total	Interruption (YES)	% Interruption	GOLD
Detectable	95	19	20.0%	2.37 [0.75-7.77]
Undetectable	42	4	9.5%	
No data	21	7	33.3%	4.75 [1.2-18.7]

Detectable load = increased risk of discontinuation (20% vs. 9.5% for undetectable), indicating a vicious cycle: poor adherence → virological failure → abandonment; alarming missing data (33.3% discontinuation): potential sign of follow-up breaks or undocumented deaths; undetectability protects (9.5% discontinuation), confirming the importance of access to viral load tests.

3.5. Distribution of Viral Load by Sex

Table 5 Viral load distribution by sex

Viral Load	Female (F)	% F	Male (M)	% M	Total
Detectable	60	63.2%	35	36.8%	95
Undetectable	29	69.0%	13	31.0%	42
No data	12	57.1%	9	42.9%	21

Female paradox: although in the majority (63.9%), girls have a higher undetectability rate (69% vs. 31% for boys); Suboptimal boys: high proportion of detectable load (36.8% of the total) despite their low number, requiring reinforced screening; Gender bias: better therapeutic adherence in girls, possibly linked to targeted "mother-child" programs.

4. Discussion

4.1. Increased vulnerability of adolescent girls living with HIV: a social and biological construction of risk

Analysis of the demographic structure of the cohort highlights a significant overrepresentation of adolescent girls, particularly those aged 11 to 15, who alone constitute more than 40% of the cases recorded. This dynamic cannot be reduced to a simple consequence of the coverage of prevention of mother-to-child transmission (PMTCT) programs. It must be understood as the product of a complex intersection between biological factors, social vulnerabilities, and gender norms. Indeed, adolescent girls are particularly exposed to early sexual intercourse, sexual violence, forced marriage, and financial dependence, all factors identified as key determinants in the international literature (Dellar et al., 2015; Chandra-Mouli et al., 2018; Cluver et al., 2016; Toska et al., 2019; Michaud et al., 2021).

The patriarchal society present in many African communities maintains a dynamic of submission that hinders access to information, sexual education, and bargaining power in intimate relationships. Furthermore, the fact that girls have easier access to health services through pre- and postnatal consultations increases their likelihood of early screening (UNAIDS, 2023; Gittings et al., 2020). This increased exposure to screening, while beneficial in terms of care, should not mask the deep structural inequalities that underlie this overrepresentation.

4.2. Under-representation of children aged 0 to 5: an indirect indicator of inadequacies in early screening

The influence of family context on treatment continuity is evident in this study. Children with undetermined parental status have a particularly high discontinuation rate (33.3%), which highlights the crucial role of the emotional and structural framework in therapeutic compliance. This group appears to suffer from a lack of stable reference points, a

lack of institutional follow-up, or even marked psychosocial isolation, all factors well documented in the literature (Howard et al., 2006; Hosegood et al., 2007).

Conversely, fatherless children receiving specific support show perfect adherence (0% interruption), which may reflect the beneficial impact of community-based orphan and vulnerable children (OVC) support programs, as reported by Thurman et al. (2012).

Furthermore, the difference between children cared for by the mother alone (12.5% interruption) and those under the sole custody of the father (20%) illustrates a gender disparity in parental care, confirmed by other studies (Kidman et al., 2017; Operario et al., 2008). These results suggest that mothers, often emotionally closer and more present in care, offer better therapeutic supervision.

4.3. ART Interruption: A Break in the Pediatric Care Continuum

The data highlight a close relationship between viral load and treatment interruption, underscoring a true vicious cycle: poor adherence leads to a detectable viral load, which in turn increases the risk of treatment discontinuation. Thus, patients with a detectable viral load are twice as likely to interrupt their treatment as those with an undetectable viral load (20% versus 9.5%).

This dynamic has been well documented by Chaiyachati et al. (2014), who argue that viral load is one of the best indirect indicators of ART adherence. Other authors (Bangsberg et al., 2001; Mills et al., 2006) point out that repeated treatment interruptions are the major cause of virological failures and progression to AIDS.

Furthermore, the extremely high discontinuation rate (33.3%) in patients without virological data raises the question of breaks in clinical follow-up, unrecorded deaths or even failures in the biological monitoring chain (Fox et al., 2012 ; Harries et al., 2010). These results argue for a strengthening of systematic and free viral load testing, particularly in resource-limited settings.

4.4. Parental status: a key factor in retention in care and compliance

The proportion of girls with an undetectable viral load (69%) far exceeds that of boys (31%), despite their overrepresentation in the sample. This positive female paradox could be explained by several factors. First, girls benefit more frequently from PMTCT programs and structured maternal medical follow-up, which promotes continuity of care (UNAIDS, 2021; Bekker et al., 2014).

Second, boys often face specific adherence challenges, such as a stigmatizing perception of the disease, a refusal of chronicity, and low community mobilization around their care (Koole et al., 2014; Fatti et al., 2014). This gendered dynamic could explain why, despite their small numbers, they contribute significantly to the overall proportion of detectable viral loads.

These results confirm the imperative of gender-differentiated care and of strengthening male involvement in health care, which is often marginalized in traditional reproductive health systems (Corneli et al., 2015; Orkin et al., 2019).

4.5. Detectable viral load: consequence or symptom of therapeutic abandonment?

The association between detectable viral load and ART interruption illustrates a vicious cycle documented in the international literature (Bygrave et al., 2012; Boerma et al., 2016; Shroufi et al., 2020). Poor adherence leads to active viral replication, generating a persistent viral load, which itself increases stigma and promotes discontinuation (Abubakar et al., 2022; Vreeman et al., 2017).

The fact that children without virological data have extremely high discontinuation rates (33.3%) reveals serious breakdowns in the health information system. This may reflect unreported deaths or loss to follow-up (Topp et al., 2017; Kim et al., 2018).

4.6. Gender disparities in viral suppression: a double reading

Despite their higher prevalence, girls have better virological performance than boys. This paradoxical situation could be explained by their better adherence, more rigorous supervision, and greater availability of targeted support programs for them (Toska et al., 2020; Judd et al., 2016; Van Dyk et al., 2019). Boys, on the other hand, suffer from a deficit of programmed attention, highlighting the need for a gender-based health approach (UNAIDS, 2023; Gittings et al., 2020).

4.7. Strategic recommendations for structural and sustainable improvement

- Integrate PCR screening into all postnatal care, with targeted staff training.
- Strengthen psychosocial support systems for children without parental support.
- Designing boy-specific membership programs by deconstructing gender stereotypes.

5. Conclusion

This retrospective study highlighted the multiple determinants of treatment adherence among children living with HIV treated at the University of Lubumbashi Center of Excellence. Analyses show that interruption of antiretroviral treatment remains frequent (19%), with a predominance among boys and children whose parental status is unknown. The overrepresentation of adolescent girls aged 11 to 15 reveals an intersectional vulnerability, linked to social, cultural, and biological factors.

The observed disparities in viral loads by sex and the presence or absence of virological data reflect both inequalities in access to care and gaps in the continuity of follow-up. Parental status, particularly when undetermined, appears to be a powerful predictor of disruption in care.

These results suggest the urgent need to strengthen systematic early screening systems, implement psychosocial support strategies adapted to family status, and design gender-specific interventions aimed at improving boys' treatment adherence. The implementation of integrated and equitable policies is an essential condition for ensuring sustainable viral suppression in this vulnerable population.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that they have no conflict of interest to disclose.

Statement of informed consent

Written informed consent was obtained from all individual participants and/or their legal guardians prior to inclusion in the study.

References

[1] Abubakar, A., Van de Vijver, FJR, & Murungi, MN (2022). Adherence to antiretroviral treatment among children and adolescents in sub-Saharan Africa: A systematic review and meta-analysis. AIDS and Behavior, 26(2), 381–398.

[2] Akimana, D., Tuyisenge, L., & Mushimiyimana, A. (2020). Gender disparities in adherence to HIV care among adolescents in Rwanda. BMC Infectious Diseases, 20(1), 917.

[3] Boender, TS, Sigaloff, KCE, McMahon, JH, et al. (2015). Long-term virological outcomes of first-line antiretroviral therapy for HIV-1 in low- and middle-income countries: A systematic review and meta-analysis. Clinical Infectious Diseases, 61(9), 1453–1461.

[4] Boerma, RS, Sigaloff, KCE, Akanmu, AS, et al. (2016). Pediatric HIV treatment failure: A global perspective. Clinical Infectious Diseases, 62(10), 1242–1249.

[5] Braun, M., Kabue, M., McCollum, ED, et al. (2022). Delays in early infant diagnosis of HIV in sub-Saharan Africa: A systematic review. Journal of the Pediatric Infectious Diseases Society, 11(2), 45–54.

[6] Chandra-Mouli, V., Ferguson, B.J., Plesons, M., et al. (2018). The political, research and programmatic challenges to meeting the sexual and reproductive health needs of adolescents living with HIV. Journal of the International AIDS Society, 21(Suppl 1), e25033.

[7] Cluver, L., Orkin, M., Meinck, F., et al. (2016). Can social protection improve sustainable adherence to antiretroviral therapy among adolescents? AIDS Care, 28(Suppl 2), 73–82.

[8] Dellar, R.C., Dlamini, S., & Abdool Karim, Q. (2015). Adolescent girls and young women: Key populations for HIV epidemic control. Journal of the International AIDS Society, 18(2Suppl 1), 19408.

[9] Dlamini, Z., Mhlanga, S., & Nuwagaba-Biribonwoha, H. (2022). Gender-sensitive approaches to improve HIV care among adolescents: A review. Journal of Adolescent Health, 71(1), 19–26.

[10] Eshun-Wilson, I., Rohwer, A., Hendricks, L., et al. (2019). Being HIV positive and staying on antiretroviral therapy in Africa: A qualitative systematic review and meta-synthesis. AIDS and Behavior, 23(2), 457–470.

[11] Fatti, G., Ngorima-Mabhena, N., Mothibi, E., et al. (2014). Outcomes of HIV-infected children after hospital discharge in South Africa. PLOS ONE, 9(4), e93744.

[12] Ferrand, RA, Simms, V., Dauya, E., et al. (2019). The effect of community adolescent treatment supporters on viral load and retention in care among adolescents living with HIV in Zimbabwe: A randomized controlled trial. The Lancet Child & Adolescent Health, 3(12), 817–826.

[13] Gittings, L., Toska, E., Medley, S., et al. (2020). "Now my life is stuck!": Experiences of adolescents and young people during COVID-19 lockdown in South Africa. AIDS and Behavior, 25(4), 1018–1036.

[14] Govindasamy, D., Ferrand, RA, Wilmore, SM, et al. (2015). Uptake and yield of HIV testing and counseling among children and adolescents in sub-Saharan Africa: A systematic review. Journal of the International AIDS Society, 18(1), 20182.

[15] Judd, A., Sohn, AH, Collins, IJ, et al. (2016). Adolescent HIV—A case for improved coordination of care. Journal of the International AIDS Society, 19(1), 21155.

[16] Kim, MH, Ahmed, S., Buck, WC, et al. (2018). The Tingathe programme: A pilot intervention using community health workers to create a continuum of care in the management of HIV-infected children and adolescents in Malawi. Journal of the International AIDS Society, 21(1), e25078.

[17] Lilungulu, A., Kalinga, A., et al. (2021). Challenges of early infant diagnosis of HIV in rural Tanzania. African Health Sciences, 21(3), 1048–1054.

[18] Mavhu, W., Willis, N., Mufuka, J., et al. (2017). Evaluating a multi-component, community-based program to improve psychosocial well-being and ART adherence among adolescents living with HIV in Zimbabwe. Journal of Adolescent Health, 60(2), 104–110.

[19] Michaud, PA, Suris, JC, & Viner, R. (2021). The adolescent with a chronic condition: Epidemiology, developmental issues and healthcare provision. Current Opinion in Pediatrics, 33(4), 374–382.

[20] Ministry of Health, DRC. (2022). Annual report of the National Multisectoral Program to Combat HIV/AIDS. Kinshasa.

[21] Musoke, P., Gavamukulya, Y., & Kimuli, D. (2020). Factors affecting early infant diagnosis of HIV in Uganda. BMC Pediatrics, 20(1), 492.

[22] Nabukeera-Barungi, N., Elyanu, P., Asire, B., et al. (2016). Adherence to antiretroviral therapy and retention in care for adolescents living with HIV from 10 districts in Uganda. BMC Infectious Diseases, 16, 304.

[23] Nabunya, P., Ssewamala, FM, et al. (2020). Family economic empowerment and support among adolescents living with HIV in Uganda. AIDS Care, 32(5), 594–600.

[24] Schneider, M., Chersich, M.F., Temmerman, M., et al. (2021). Understanding the barriers to access HIV testing and counseling services among adolescent boys in sub-Saharan Africa. The Lancet HIV, 8(9), e559–e568.

[25] Shroufi, A., Gunguwo, H., et al. (2020). Mother-to-child transmission of HIV and the role of early infant diagnosis programs. BMC Infectious Diseases, 20(1), 678.

[26] Topp, SM, Mwamba, C., Sharma, A., et al. (2017). Improving retention in HIV care among adolescents and youth in Zambia: A realistic evaluation of the BHOMA intervention. Health Policy and Planning, 32(9), 1230–1241.

[27] Toska, E., Cluver, L., Hodes, R., et al. (2020). Sex and secrecy: How HIV-status disclosure affects safe sex among HIV-positive adolescents. AIDS Care, 32(2), 181–187.

[28] UNAIDS. (2023). Global AIDS Update: The path that ends AIDS. https://www.unaids.org/en/resources/documents

[29] Van Dyk, A.C., & Van Dyk, P.J. (2019). "What is the point of knowing?": Adolescent HIV disclosure and social support. AIDS Care, 31(4), 471–478.

[30] Vreeman, RC, Scanlon, ML, Mwangi, A., et al. (2017). Interventions to promote adherence to antiretroviral therapy in children and adolescents in low- and middle-income countries: A systematic review. Pediatrics, 139(6), e20172893.

[31] Willis, N., Napei, T., Armstrong, A., et al. (2018). Zvandiri—Bringing a differentiated service delivery program to scale for children, adolescents, and young people in Zimbabwe. Journal of Acquired Immune Deficiency Syndromes, 78(Suppl 2), S115–S123.