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Factors associated with adherence to HIV treatment among adolescent girls and young women in the Imagine programme in South Africa: A mixed-methods study protocol

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Background. Adherence to antiretroviral therapy (ART) is critical to achieving viral suppression and reducing HIV-related morbidity and transmission. However, consistent adherence remains a challenge, particularly among adolescent girls and young women (AGYW) in sub-Saharan Africa (SSA), an already vulnerable group disproportionately affected by HIV. In SSA, AGYW account for the majority of new infections, and despite widespread availability of ART and ambitious national targets, optimal adherence is not being consistently achieved.
Objectives. To identify factors associated with adherence to HIV treatment among AGYW enrolled in the Imagine programme, a school-based HIV and pregnancy prevention intervention implemented in 14 rural schools in North West and KwaZulu-Natal provinces, South Africa (SA).
Methods. Employing a mixed-methods design, the cross-sectional study will conduct secondary quantitative analysis of data collected in the Imagine programme. Additionally, primary data will be obtained from in-depth interviews conducted with a subset of participants to explore perceptions, barriers and experiences related to adherence. Quantitative data will be analysed using descriptive statistics and logistic regression to assess associations between adherence and sociodemographic, behavioural and structural factors. Qualitative data will be analysed thematically to provide contextual insights.
Conclusion. This study addresses a critical evidence gap by focusing on adherence in a rural AGYW population. The findings are expected to inform both programme implementation and broader adolescent HIV treatment strategies in SA.

Keywords. Adolescent girls and young women, AGYW, ART adherence, school-based intervention, HIV

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Adherence to antiretroviral therapy (ART) among adolescent girls and young women (AGYW) remains a major public health challenge, particularly in sub-Saharan Africa (SSA), where this population carries a disproportionate burden of HIV infection.[1,2] Despite major progress in ART scale-up, many AGYW still struggle to remain engaged in care and adherent to treatment, increasing the risk of poor health outcomes and onward transmission.[2] In 2023, ~4 000 AGYW aged 15 - 24 years acquired HIV each week worldwide, with ~3 100 of these infections occurring in SSA.[3] Of all new infections in SSA, 77% are in AGYW, and this group is three times more likely to acquire HIV than their male counterparts.[3]

To address ongoing disparities in HIV prevention, diagnosis and treatment, the UNAIDS 95-95-95 targets were adopted in 2021 to ensure that by 2025, 95% of people living with HIV (PLHIV) know their status, 95% of those diagnosed initiate ART, and 95% of those on ART achieve viral suppression.[4] South Africa (SA), home to an estimated 7.9 million PLHIV,[5] has made significant progress, with 96% aware of their status, 79% initiated on ART, and 94% virally suppressed.[6] However, sustaining viral suppression remains a challenge.[5] Long-term adherence is critical, yet adherence rates among AGYW remain suboptimal despite availability of biomedical and psychosocial services.[7,8] Understanding the factors influencing adherence in this population is essential to designing effective interventions.

Literature review

The literature shows that adherence to ART is influenced by a mix of individual, social, structural and health system factors. Globally and in SSA, common barriers include forgetfulness, fear of

disclosure, stigma, side-effects, substance use, complex regimens, and difficulties in maintaining adherence when away from home, as highlighted by Mills *et al*.[9] Structural challenges are especially prominent in developing countries, where financial constraints, food insecurity and medication stock-outs further hinder adherence.[9] In SSA, overall adherence remains relatively high (77 - 84%), yet barriers such as comorbidities, low motivation for long-term treatment, socioeconomic challenges and medication side-effects persist, as reported by Almeida *et al*.[10] Croome *et al*.[11] similarly identified recurring barriers including lack of food, stigma, adverse effects and travel-related interruptions, while facilitators included strong social support, reminders, disclosure, and positive relationships with healthcare providers.

Healthcare system limitations further affect adherence. Boyer *et al*.[12] demonstrated the influence of hospital size, inadequate psychosocial support, stock-outs and limited task-shifting. SA qualitative studies provide additional context: Simelane *et al*.[13] found that insufficient staffing and long waiting times were key barriers, while clear instructions, positive provider attitudes, and awareness of the consequences of defaulting supported adherence. Mashele *et al*.[14] identified themes such as disclosure, acceptance, economic constraints, mobile reminders, and especially family support as critical enablers.

Adolescents and young people face additional developmental and psychosocial challenges. Arnold *et al*.[15] showed that adherence among youth aged 12 - 24 years improves with strong interpersonal support, while Bermudez *et al*.[16] and Azmeraw and Wasie[17] found that household stability, caregiver employment, savings and caregiver education improve adolescent adherence. However, adherence among SA adolescents remains suboptimal. Zhou *et al*.[18] reported that although 66% initially adhered, only 37.1% maintained adherence over time, with older adolescents at particular risk. Cluver *et al*.[19] found that adolescents who knew their HIV status were more than twice as likely to adhere, especially when disclosure occurred before age 12.

Overall, the literature highlights that adherence to ART is shaped by interacting behavioural, social, structural and system-level factors. Adolescents face heightened challenges owing to stigma, developmental stage and psychosocial vulnerability, although family support, early disclosure and positive provider relationships are strong facilitators. However, persistent gaps in reaching adolescents living with HIV underscore the need for context-specific and adolescent-friendly strategies to support long-term ART adherence.

Research problem

Despite the expansion of ART services and progress towards the 95-95-95 targets, adherence among AGYW remains a challenge.[20] There is limited research focusing specifically on AGYW in rural and resource-constrained settings, particularly those engaged in school-based HIV programmes. The Imagine programme, a school-based HIV and pregnancy prevention intervention implemented in 14 rural schools,[21] provides a unique opportunity to examine these factors. This study seeks to address this evidence gap by combining quantitative and qualitative approaches to better understand both adherence patterns and lived experiences.

Objectives

The aim of this study is to identify factors associated with adherence to HIV treatment among AGYW enrolled in the Imagine programme, with the following objectives: (*i*) to describe sociodemographic, behavioural, structural and adherence factors among AGYW living with HIV in the Imagine programme; (*ii*) to determine associations between these factors and adherence outcomes; and (*iii*) to explore perceptions, barriers and experiences related to ART adherence among AGYW.

Hypothesis. There are measurable sociodemographic, behavioural and structural factors associated with adherence to HIV treatment among AGYW in the Imagine programme.

Methods

Study design and setting

This is a mixed-methods study combining quantitative secondary data analysis with qualitative primary data collection. The quantitative component will analyse data from the supplementary paper-based questionnaire completed by 188 AGYW living with HIV in 2025, who are enrolled in the Imagine programme. The qualitative component will involve semi-structured interviews with 10 - 15 participants, selected randomly from those who indicated willingness to participate in follow-up interviews. The study is set in 14 schools participating in the Imagine programme, located in Moretele and Newcastle in North West and KwaZulu-Natal provinces, SA.

Population, sampling and sample size

All AGYW aged 15 - 24 years who are enrolled in the Imagine programme, living with HIV, and completed the supplementary questionnaire in 2025 will be included in the quantitative secondary analysis (n=188). For the qualitative component, participants will be randomly selected from the consented list until saturation is reached. All selected participants will be invited to voluntarily participate in the qualitative interviews.

Variables and measurements

Adherence (outcome variable) will be defined as a viral load <50 copies/mL or self-reported 100% adherence in the past 30 days, consistent with Southern African HIV Clinicians Society guidelines.[22] Exposure variables are defined in Table 1.

Data management and analysis

Quantitative data will be cleaned, anonymised, and analysed using Stata 18 (StataCorp, USA). Categorical variables will be summarised using proportions and percentages, while continuous variables will be described using means or medians, along with standard deviations or ranges, as appropriate. Associations between categorical variables will be assessed using Pearson's χ^2 test, with a p-value <0.05 considered statistically significant. Multivariate analysis will be conducted using logistic regression to examine associations between adherence and sociodemographic, behavioural and structural factors.

Qualitative data will be transcribed and analysed thematically using an inductive approach. Codes will be iteratively refined into

categories and themes, with triangulation between quantitative and qualitative findings to strengthen interpretation.

Ethical considerations

Approval to conduct the study will be sought from the principal investigator of the Imagine programme as well as the Department of Basic Education. Ethical approval will be obtained from the University of Pretoria Faculty of Health Sciences Research Ethics Committee. Informed consent will be obtained from participants aged ≥18 years, and assent from those aged 15 - 17. Participation is voluntary and withdrawal is permitted at any time. Parental or guardian consent will not be sought, as the study involves sensitive information and some participants may not have disclosed their HIV status to their caregivers, nor wish to do so.

Interviews will be conducted in safe spaces within schools. Sensitive disclosures of adherence difficulties or stigma will be referred to appropriate support services, prioritising specialised and confidential care options. Participation will be entirely voluntary, and participants will be informed of their right to decline participation or withdraw from the study at any time without consequence.

Participant confidentiality will be protected throughout the study. For both the quantitative and qualitative components, all data will be anonymised. Audio recordings will be labelled using unique identifiers/pseudonyms rather than participant names. Pseudonyms will be used during transcription to further protect anonymity. All data will be stored in a password-protected system. Consent forms will be stored separately from the questionnaires to prevent linkage between participants and their responses.

Dissemination

Findings will be shared through peer-reviewed publications,

Table 1. Measurement of quantitative variables

Variable	Measurement
Outcome of interest	
Adherence	Binary: Adherent = VL <50 copies/mL or self-reported 100% adherence (past 30 days) Non-adherent = VL >50 copies/mL or self-reported <100% adherence (past 30 days)
Exposure variables	
Sociodemographic information	
Grade	Categorical
Household composition	Categorical
Orphanhood status	Categorical
Type of house (proxy for socioeconomic status)	Categorical
Behavioural factors	
Currently in a romantic relationship	Binary
Age difference with current romantic partner	Categorical
Ever had sex	Binary
Experienced sexual, emotional or physical abuse	Binary
Ever consumed alcohol or recreational drugs	Binary
Disclosure and stigma	
Disclosed status to partner/friends/household members	Binary
Experienced stigma (uncomfortable acts)	Ordinal: Never/Sometimes/Often
Heard hurtful comments about PLHIV	Ordinal: Never/Sometimes/Often
Felt judged by family	Ordinal: Never/Sometimes/Often
Treated badly by others due to HIV	Ordinal: Never/Sometimes/Often
Structural factors	
Distance to nearest health facility	Categorical: <2 km/2 - 5 km/>5 km
Financial barrier to public care	Binary
Comfortable discussing HIV at clinic	Binary
Avoided clinic due to staff treatment	Binary
Experienced stock-outs	Categorical (multiple responses)
Comparison of nurse attitudes	Categorical
Mental health factors	
Felt sad/down/hopeless (past 2 weeks)	Ordinal: Never/Rarely/Sometimes/Often
Felt anxious/worried/overwhelmed	Ordinal: Never/Rarely/Sometimes/Often
Thoughts of self-harm	Categorical: Never/Yes – no action/Yes – attempted

VL = viral load; PLHIV = people living with HIV.

conference presentations, and reports to stakeholders including the departments of Health and Basic Education in participating provinces. Results will be presented in aggregate, without identifying information.

Declaration. The research for this study will be done in partial fulfilment of the requirements for LN's MMed (Public Health Medicine) degree at the University of Pretoria.

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Author contributions. LN, TP and FA conceptualised the study. LN drafted the original protocol, which was reviewed and revised by all authors. LN will be responsible for conducting all aspects of the study and preparing the final write-up, while TP and FA will supervise the study.

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Conflicts of interest. None.

1. Stoner MCD, Kelly NK, Gomez-Olive FX, et al. Relationships between stress-responsive biomarkers, ART adherence, and viral suppression among adolescent girls and young women living with HIV in South Africa: An HPTN 068 analysis. J Acquir Immune Defic Syndr 2023;92(5):349-358. https://doi.org/10.1097/qai.0000000000003149
2. Altamirano J, Odero IA, Omollo M, et al. Understanding ART adherence among adolescent girls and young women in western Kenya: A cross-sectional study of barriers and facilitators. Int J Environ Res Public Health 2023;20(20):6922. https://doi.org/10.3390/ijerph20206922
3. Joint United Nations Programme on HIV/AIDS (UNAIDS). Global HIV & AIDS statistics – fact sheet. 2024. https://www.unaids.org/en/resources/fact-sheet (accessed 30 January 2025).
4. Joint United Nations Programme on HIV/AIDS (UNAIDS). Understanding measures of progress towards the 95-95-95 HIV testing, treatment and viral suppression targets. 2024. https://www.unaids.org/en/resources/documents/2024/progress-towards-95-95-95 (accessed 16 April 2025).
5. International AIDS Society. Reaching the 95-95-95 targets: The importance of multi-stakeholder collaboration – key considerations to reach the 95-95-95 targets. Geneva: IAS, 2021. https://www.iasociety.org/sites/default/files/CPP/IAS-CPP-Key-considerations.pdf (accessed 2 January 2026).
6. Minister Aaron Motsoaledi: Press statement about status of HIV/Aids and TB campaign in South Africa. Pretoria: Government Communications, 2025. https://www.gov.za/news/media-statements/minister-aaron-motsoaledi-press-statement-about-status-hivaids-and-tb (accessed 2 January 2026).
7. Shisana O, Stoker D, Simbayi LC, et al. South African national household survey of HIV/AIDS prevalence, behavioural risks and mass media impact – detailed methodology and response rate results. S Afr Med J 2004;94(4):283-288.
8. Schaecher KL. The importance of treatment adherence in HIV. Am J Manag Care 2013;19(12 Suppl):s231-s237.
9. Mills EJ, Nachega JB, Bangsberg DR, Adherence to HAART: A systematic review of developed and developing nation patient-reported barriers and facilitators. PLoS Med 2006;3(11):e438. https://doi.org/10.1371/journal.pmed.0030438
10. Almeida PRS, Rafael CAC, Pimentel V, Abecasis AB, Sebastião CS, Morais J. Adherence to antiretroviral therapy among HIV-1 patients from sub-Saharan Africa: A systematic review. AIDS Rev 2024;26(3):102-110. https://doi.org/10.24875/AIDSRev.24000004
11. Croome N, Ahluwalia M, Hughes LD, Abas M. Patient-reported barriers and facilitators to antiretroviral adherence in sub-Saharan Africa. AIDS 2017;31(7):995-1007. https://doi.org/10.1097/qad.0000000000001416
12. Boyer S, Clerc I, Bonono CR, Marcellin F, Bilé PC, Ventelou B. Non-adherence to antiretroviral treatment and unplanned treatment interruption among people living with HIV/AIDS in Cameroon: Individual and healthcare supply-related factors. Soc Sci Med 2011;72(8):1383-1392. https://doi.org/10.1016/j.socscimed.2011.02.030
13. Simelane PT, Simelane MS, Amoateng AY. Barriers and facilitators to adherence for antiretroviral therapy: The perspectives of patients from a wellness center in the Mpumalanga Province, South Africa. Afr Health Sci 2022;22(3):455-462. https://doi.org/10.4314/ahs.v22i3.49
14. Mashele V, Marincowitz GJO, Marincowitz C. Factors influencing adherence to antiretroviral therapy among young adults in Limpopo province. S Afr Fam Pract 2024;66(1):e1-e6. https://doi.org/10.4102/safp.v66i1.5973
15. Arnold EM, Kamal S, Rotheram-Borus MJ, et al. Factors associated with antiretroviral adherence among youth living with HIV. J Acquir Immune Defic Syndr 2024;95(3):215-221. https://doi.org/10.1097/qai.0000000000003345
16. Bermudez LG, Jennings L, Ssewamala FM, Nabunya P, Mellins C, McKay M. Equity in adherence to antiretroviral therapy among economically vulnerable adolescents living with HIV in Uganda. AIDS Care 2016;28(Suppl 2):83-91. https://doi.org/10.1080/09540121.2016.1176681
17. Azmeraw D, Wasie B. Factors associated with adherence to highly active antiretroviral therapy among children in two referral hospitals, northwest Ethiopia. Ethiop Med J 2012;50(2):115-124.
18. Zhou S, Cluver L, Shenderovich Y, Toska E. Uncovering ART adherence inconsistencies: An assessment of sustained adherence among adolescents in South Africa. J Int AIDS Soc 2021;24(10):e25832. https://doi.org/10.1002/jia2.25832
19. Cluver LD, Hodes RJ, Toska E, et al. 'HIV is like a tsotsi. ARVs are your guns': Associations between HIV-disclosure and adherence to antiretroviral treatment among adolescents in South Africa. AIDS 2015;29(Suppl 1):S57-S65. https://doi.org/10.1097/qad.0000000000000695
20. Nyasulu JCY, Maposa I. Progress towards 90-90-90 and 95-95-95 strategy implementations and HIV positivity trends in the City of Johannesburg. S Afr Med J 2023;114(1):51-55. https://doi.org/10.7196/SAMJ.2024.v114i1.862
21. Abdullah F, Naledi T, Nettleship E, et al. First social impact bond for the MRC: A novel financing strategy to address the health and social challenges facing adolescent girls and young women in South Africa. S Afr Med J 2019;109(11b):57-62. https://doi.org/10.7196/SAMJ.2019.v109i11b.14254
22. Southern African HIV Clinicians Society. Guidelines for antiretroviral therapy in adults: 2023 update. 2023. https://sahivsoc.org/Files/SAHCS%20Adult%20ART%202023%20Guidelines%20(1107).pdf (accessed 2 January 2026).

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