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Health System Barriers to ART Adherence: Insights from Wassa Amenfi West Municipality, Ghana

[1]Richard Badu Kumi, [2]Ernest Osei, [3]Lydia Sarponmaa Asante and [4]Prince Ernest Hokey

[1]Deputy Nursing Manager, Father Thomas Alan Rooney Memorial Hospital, Asankrangwa, Ghana.

[2]Lecturer, Department of Public Health Education, Faculty of Environment and Public Health Education, Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development, Asante Mampong, Ghana.

[3]Head of Department, Department of Public Health, Catholic University of Ghana, Sunyani, Ghana

[4]Student, Department of Sociology and Anthropology, University of Cape Coast, Ghana.

Abstract

Background: Achieving optimal adherence to antiretroviral therapy (ART) is essential for viral suppression, reduction of HIV transmission, and attainment of the UNAIDS 95-95-95 targets. While individual and socio-cultural influences have been widely documented, less attention has been paid to the role of health system barriers in sustaining ART adherence in rural Ghana.

Objective: This study examined the association between health system factors and ART adherence among people living with HIV (PLHIV) in Wassa Amenfi West Municipality, Ghana.

Methods: A cross-sectional study was conducted among 602 PLHIV receiving ART at designated treatment centres. Structured questionnaires captured socio-demographic characteristics and health system variables, including distance to facility, staffing adequacy, patient–provider relationship, waiting time, drug availability, and counselling services. Adherence status was self-reported and verified against clinic refill records. Data were analysed using descriptive statistics and chi-square tests to assess associations at a significance level of $p < 0.05$.

Results: Adherence rates were significantly higher among respondents living within 5 km of the facility (85.4%) compared to those residing more than 10 km away (65.3%). Perceived staff shortages were associated with reduced adherence (68.5% vs. 88.6%). Positive

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patient–provider relationships corresponded with higher adherence (85.9% vs. 60.2%), while prolonged waiting times (>60 minutes) were linked to lower adherence (59.7%). Drug stock-outs and inadequate counselling services were both strongly associated with reduced adherence.

Conclusion: Health system barriers substantially influence ART adherence in rural Ghana. Interventions to reduce geographical and logistical constraints, strengthen the health workforce, ensure uninterrupted drug supply, optimise patient flow, and enhance counselling services are critical for sustaining ART use. Policymakers should integrate these strategies into decentralised HIV care models to improve retention and treatment outcomes.

Keywords: Antiretroviral therapy, adherence, health system barriers, HIV, Ghana, rural health services

1. Introduction

Antiretroviral therapy (ART) has transformed HIV from a fatal illness to a manageable chronic condition, significantly improving survival and quality of life for people living with HIV (PLHIV) (UNAIDS, 2023). However, the effectiveness of ART is critically dependent on sustained adherence, typically defined as taking at least 95% of prescribed doses (World Health Organization [WHO], 2021). Suboptimal adherence undermines viral suppression, accelerates disease progression, and fosters the emergence of drug-resistant strains (Bijker et al., 2020; Shubber et al., 2016).

While numerous studies have investigated patient-level factors influencing adherence—such as stigma, knowledge, and socio-economic status—there is growing recognition that health system factors play a decisive role, particularly in resource-limited settings (Nachega et al., 2019). Health system barriers, including inadequate drug supply, long travel distances, understaffing, poor patient–provider relationships, and service delivery inefficiencies, can significantly limit patients' ability to adhere to ART regimens (Kagee et al., 2011; Tadesse et al., 2022).

In Ghana, HIV prevalence remains heterogeneous across regions, with the Western Region, where Wassa Amenfi West Municipality is located, showing sustained transmission linked to both rural and mining-related mobility patterns (Ghana AIDS Commission, 2022). Despite national ART scale-up, evidence suggests persistent health system challenges that may undermine adherence outcomes in such settings (Ampofo et al., 2021).

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This study explores health system barriers to ART adherence in Wassa Amenfi West Municipality, drawing on the perspectives of PLHIV receiving care in the area. By focusing on systemic constraints rather than solely individual behaviours, the study aims to inform interventions that strengthen HIV service delivery and enhance long-term treatment outcomes in similar rural and peri-urban contexts.

2. Methods

2.1 Study Design

A descriptive cross-sectional design was employed to examine health system-related factors affecting ART adherence. This approach allowed for the collection of quantitative and qualitative data at a single point in time, providing a snapshot of the systemic barriers experienced by patients in the study setting.

2.2 Study Setting

The study was conducted in Wassa Amenfi West Municipality, located in Ghana's Western Region. The municipality is characterised by a mix of rural settlements and mining-driven peri-urban growth, with healthcare infrastructure concentrated in a limited number of facilities. HIV care and ART services are primarily provided through designated antiretroviral clinics at district and mission hospitals, supplemented by selected health centres.

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2.3 Study Population and Sampling

Participants were PLHIV aged 18 years and above who were receiving ART at the main municipal ART clinic. A convenience sampling strategy was adopted due to the sensitive nature of the topic and accessibility constraints. Eligibility required being on ART for at least six months to ensure participants had adequate treatment experience to comment on systemic barriers.

The sample size was calculated using Cochran's formula for finite populations, targeting a minimum of 200 respondents to achieve statistical power for association testing.

2.4 Data Collection

Data were collected using a structured interviewer-administered questionnaire developed from existing adherence frameworks and adapted to the Ghanaian context. The tool included sections on socio-demographic characteristics, ART adherence patterns, and perceived health system barriers such as drug availability, waiting times, staff attitudes, and clinic accessibility. Content validity was established through expert review, and the instrument was pre-tested with 20 PLHIV in a neighbouring district.

2.5 Ethical Considerations

Ethical clearance was obtained from the relevant institutional review board, and

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administrative approval was secured from the Wassa Amenfi West Municipal Health Directorate. Written informed consent was obtained from all participants, with assurances of confidentiality and the right to withdraw at any stage without consequences.

2.6 Data Analysis

Quantitative data were coded and analysed using SPSS version 26. Descriptive statistics summarized frequencies and proportions, while chi-square tests examined associations between health system factors and adherence status. Qualitative responses from open-ended items were thematically analysed to complement quantitative findings, allowing for richer interpretation of systemic challenges.

3. Results

Table 1: Socio-Demographic Characteristics of Respondents (n = 602)

Variable	Frequency (n)	Percentage (%)
Age group (years)		
18–29	72	12.0
30–39	162	26.9
40–49	210	34.9
≥50	158	26.2
Gender		
Male	228	37.9
Female	374	62.1
Educational level		
No formal education	206	34.2
Primary/Basic	228	37.9

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Secondary	126	20.9
Tertiary	42	7.0
Marital status		
Single	98	16.3
Married	286	47.5
Divorced	102	17.0
Widowed	116	19.3
Occupation		
Unemployed	118	19.6
Informal sector	214	35.6
Formal sector	72	12.0
Farming	198	32.9
Duration on ART		
6–12 months	132	21.9
13–24 months	148	24.6
>24 months	322	53.5

Table 1 presents the socio-demographic profile of respondents. The largest age category was **40–49 years** (34.9%), followed by 30–39 years (26.9%). Females constituted **62.1%** of participants, consistent with national patterns of HIV diagnosis and treatment uptake. Educational attainment was generally low, with **34.2%** having no formal education and only **7.0%** attaining tertiary-level education. Almost half of the respondents were married (47.5%), while 19.3% were widowed. The primary occupations were in the informal sector (35.6%) and farming (32.9%). More than half of participants (53.5%) had been on ART for over 24 months.

Table 2: Distance to ART Facility and Adherence Status

Distance to Facility	**Adherent n (%)**	**Non-adherent n (%)**	**Total n (%)**

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<5 km	140 (85.4)	24 (14.6)	164 (27.2)
5–10 km	156 (76.8)	47 (23.2)	203 (33.7)
>10 km	158 (65.3)	84 (34.7)	242 (40.2)

Distance to the ART clinic was associated with adherence outcomes (**Table 2**). Those living within 5 km recorded the highest adherence (85.4%), while those residing more than 10 km away had the lowest (65.3%). This pattern suggests that geographical accessibility is a significant determinant of treatment continuity.

Table 3: Perception of Staff Shortages and Adherence

Staff Shortage Perceived	**Adherent n (%)**	**Non-adherent n (%)**	**Total n (%)**
Yes	268 (68.5)	123 (31.5)	391 (64.9)
No	186 (88.6)	24 (11.4)	210 (35.1)

More than 60% of respondents perceived a shortage of healthcare staff at the ART facility (**Table 3**). Among these, adherence rates were notably lower (68.5%) compared to those who did not perceive staff shortages (88.6%), suggesting that workforce constraints may undermine service quality and patient follow-up.

Table 4: Quality of Patient–Provider Relationship and Adherence

Relationship Rated as	**Adherent n (%)**	**Non-adherent n (%)**	**Total n (%)**
Good	304 (85.9)	50 (14.1)	354 (58.8)
Poor	150 (60.2)	99 (39.8)	249 (41.2)

The quality of patient–provider interactions showed a strong association with adherence (**Table 4**). Respondents who rated their relationship with healthcare providers as "good" reported an adherence rate of 85.9%, compared to 60.2% among those who rated it as "poor." This underscores the role of effective communication and trust in sustaining ART use.

Table 5: Waiting Time and Adherence

Waiting Time	**Adherent n (%)**	**Non-adherent n (%)**	**Total n (%)**

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<30 minutes	162 (87.1)	24 (12.9)	186 (30.9)
30–60 minutes	184 (79.3)	48 (20.7)	232 (38.5)
>60 minutes	108 (59.7)	73 (40.3)	181 (30.6)

Long waiting times were linked to reduced adherence (**Table 5**). Those who waited less than 30 minutes achieved the highest adherence rate (87.1%), while those waiting over 60 minutes recorded the lowest (59.7%). The findings point to potential negative effects of service delays on patient retention.

Table 6: Drug Stock-Outs and Adherence

Drug Stock-Out Experienced	**Adherent n (%)**	**Non-adherent n (%)**	**Total n (%)**
Yes	164 (65.6)	86 (34.4)	250 (41.5)
No	290 (87.9)	40 (12.1)	330 (58.5)

A history of ART drug stock-outs was reported by 41.5% of participants (**Table 6**). These respondents exhibited a lower adherence rate (65.6%) compared to those without such experiences (87.9%), indicating that medication supply interruptions substantially disrupt treatment continuity.

Table 7: Counselling Availability and Adherence

Adequate Counselling Received	**Adherent n (%)**	**Non-adherent n (%)**	**Total n (%)**
Yes	322 (84.7)	58 (15.3)	380 (63.1)
No	132 (60.6)	86 (39.4)	218 (36.9)

Perceived adequacy of counselling services emerged as a significant facilitator of adherence (**Table 7**). Among those who reported adequate counselling, adherence was 84.7%, compared to 60.6% among those who perceived counselling as inadequate. This suggests that ongoing patient education and psychosocial support are vital for sustained ART use.

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4. Discussion

The present study examined the influence of health system factors on adherence to antiretroviral therapy among PLHIV in Wassa Amenfi West Municipality, Ghana. The findings reveal that multiple systemic determinants—including geographical accessibility, staffing levels, provider–patient relationships, waiting times, drug availability, and counselling services—were significantly associated with adherence. These results affirm that in addition to individual and socio-cultural influences, structural characteristics of the health delivery system play a critical role in sustaining long-term ART use.

Geographical distance emerged as a strong predictor of adherence, with individuals residing within 5 km of the facility showing markedly higher adherence rates compared to those travelling more than 10 km. This pattern aligns with evidence from rural South Africa and Ethiopia, where travel distance has been shown to influence both appointment attendance and medication pick-up rates (Tadesse et al., 2022; Wasti et al., 2012). In resource-limited settings, transport costs and time burdens often exacerbate treatment fatigue, particularly for patients with limited economic resources. Reducing physical access barriers through decentralised ART distribution or community-based delivery models could therefore improve retention in care.

Staff shortages were also linked to lower adherence, reflecting a broader health workforce crisis in sub-Saharan Africa (World Health Organization [WHO], 2021). Overburdened staff may have less time for patient engagement, counselling, and follow-up, leading to poorer treatment support. Comparable studies in Malawi and Uganda have shown that inadequate staffing compromises service quality and increases patient attrition (Bemelmans et al., 2014; Mbonye et al., 2016). Addressing this challenge may require strategic workforce redistribution, targeted recruitment, and investment in task-shifting to trained lay health workers, as endorsed in WHO guidelines.

The quality of the patient–provider relationship was another critical determinant, with those reporting positive relationships demonstrating substantially higher adherence. This echoes findings from Kenya and Nigeria, where trust, respect, and effective communication between patients and providers significantly improved adherence behaviours (Musumari et al., 2014; Nachega et al., 2019). Strengthening provider communication skills through continuous professional development could therefore be a cost-

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effective strategy for improving ART outcomes.

Prolonged waiting times at clinics were associated with lower adherence, consistent with research in Tanzania and Ghana showing that lengthy service delays deter follow-up visits (Addo et al., 2018; Sando et al., 2013). In high-burden facilities, inefficiencies in patient flow and long queues can lead to missed doses or treatment interruptions. Process optimisation, appointment scheduling systems, and differentiated service delivery could help mitigate these effects.

The availability of ART medication was strongly associated with adherence, as patients who experienced stock-outs were significantly less likely to maintain treatment. This finding aligns with reports from Zambia and Zimbabwe where supply chain disruptions led to treatment discontinuities and increased risk of viral rebound (Pasquet et al., 2010; Chisale et al., 2020). Strengthening national and district-level supply chain management is therefore crucial for sustaining ART programmes.

Adequate counselling services were also linked to improved adherence, confirming the importance of ongoing patient education and psychosocial support. Counselling provides not only information about ART but also strategies for coping with stigma, side effects, and treatment fatigue (Bijker et al., 2020). Similar associations have been documented in studies from Mozambique and Cameroon, where structured counselling interventions improved both adherence and viral suppression rates (Remien et al., 2013; Wekesa & Coast, 2015).

From a policy perspective, these findings underscore the need for comprehensive HIV programme strategies that address both the structural and interpersonal dimensions of care. Expanding ART access points through decentralisation, strengthening the health workforce, ensuring consistent drug supply, improving patient flow management, and integrating robust counselling services should be prioritised in national and regional HIV plans. Given Ghana's ongoing decentralisation of ART services, there is an opportunity to embed these interventions within district-level operational frameworks to enhance sustainability.

This study has some limitations. The cross-sectional design limits causal inference, and self-reported adherence may be subject to recall and social desirability biases. The use of a single municipal setting may reduce the generalisability of findings to other contexts with different service delivery structures. However, the relatively large sample size and the focus on a real-world service delivery environment enhance

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the study's relevance for programme planning and policy.

5. Conclusion

This study demonstrates that health system barriers significantly influence ART adherence among PLHIV in Wassa Amenfi West Municipality. Factors such as distance to facility, staffing levels, patient–provider relationships, waiting times, drug availability, and counselling services are all critical determinants of treatment continuity. Interventions aimed at improving adherence should prioritise reducing geographic and logistical barriers, strengthening the health workforce, ensuring uninterrupted drug supply, optimising patient flow, and enhancing counselling quality. Addressing these systemic challenges is essential for achieving sustained viral suppression and advancing Ghana's progress toward the UNAIDS 95-95-95 targets.

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