Journal of HIV and AIDS
ISSN 2380-5536 | Open Access

RESEARCH ARTICLE

Volume 8 - Issue 1

Determinant of Antiretroviral Therapy Adherence among Patients Using Community Pharmacies and Public Hospitals as their HIV-Focused Pick-up Centres: A Comparative Study

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Received: 25 Jun, 2024 | **Accepted:** 12 Jul, 2024 | **Published:** 18 Jul, 2024

Citation: Olaleye BO, Ilesanmi OS (2024) Determinant of Antiretroviral Therapy Adherence among Patients Using Community Pharmacies and Public Hospitals as their HIV-Focused Pick-up Centres: A Comparative Study. J HIV AIDS 8(2): dx.doi.org/10.16966/2380-5536.190

Abstract

Introduction: Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS) is a major global health emergency that affects all regions of the world, countries, races, and different groups of people causing millions of deaths and suffering. This study aimed to determine ARV therapy adherence among patients using community pharmacies and Eleta Hospital in Ibadan, Nigeria.

Methods: A cross-sectional study that employed quantitative data collection methods from 373 patient records at 10 community pharmacies and 227 patients' records at Eleta secondary facility were conducted. Descriptive statistics and inferential statistics, including Chi-square and logistic regression analysis, were used to find adherence rates to Antiretroviral Therapy (ARV).

Results: The median age of the participants was 37.35 and 393 (65.5%) were females. The study revealed that the default rates were higher in community pharmacies (17%) than in the secondary facility (6%). Those who utilized community pharmacies were 265 (71.2%) while 128 (56.4%) used the general hospital. Male patients had significantly higher odds (approximately four times) of HIV medication adherence compared to female patients (AOR = 4.082, $p < 0.001$). When considering community and secondary health facility data, male patients had significantly higher odds (approximately 2.43 times) of adherence than female patients (AOR = 2.426, $p = 0.002$).

Conclusion: Both community-based and facility-based pick-up centers have the potential of improving adherence rates. These insights can be used to develop comprehensive strategies aimed at reducing the burden of HIV/AIDS.

Keywords: HIV; ART adherence; Default from care; Community Pharmacies refill pick-up centers; Comparative study

Abbreviations: AIDS-Acquired Immune Deficiency Disease Syndrome; ART-Antiretroviral treatment; HIV-Human Immunodeficiency Virus; CPARP- Community Pharmacy ARV Refill Program

Introduction

Globally, it is estimated that close to 40 million people live with HIV/AIDS, among which the majority are adults, and it was also estimated that there are 1.9 million people living with HIV in Nigeria [1,2]. The first step towards reducing the transmission of this public health menace in the absence of preventive vaccines is to educate the masses on the need to improve their preventive practices and health-seeking behavior [3,4].

In Nigeria, the National HIV and AIDS Strategic Framework aims to diagnose 90% of all HIV-positive individuals, necessitating a comprehensive assessment of service delivery aspects such as supply chain management, funding, advocacy, and organizational processes (NACA, 2017). Despite progress, Nigeria struggles with a significant HIV burden, with 1.8 million Nigerians estimated to be living with HIV as of 2019 and an adult prevalence rate of 1.4% [5,6].

Adherence to Antiretroviral Treatment (ART) becomes crucial, with a required adherence rate of 90%-95% to achieve viral suppression [7]. Poor adherence is a serious public health concern and was reported as one of the ways of introducing complication to HIV/AIDS as it can lead to the viral resistance thereby leading to failure of cheap first-line treatment regimens and increase the spread of multi-drug resistant forms of the virus [8].

Studies relating to HIV care adherence have yielded invaluable insights into effective intervention strategies and the factors influencing patient outcomes. Studies, such as those conducted by[9], emphasize the pivotal role of patient education and personal counseling in ensuring continuous care, thereby contributing to the attainment of the desired patient and population health outcomes. Also, socio-demographic characteristics, including sex, age, education, and socio-economic status, have been identified as

determinants of missed appointments and default rates in HIV care programs [10,11]. Additionally, clinical factors such as CD4 cell count, treatment stage, absence of AIDS diagnosis, long-term ARV refills, un-suppressed viral loads, specific regimens, or detectable viral loads, are reported to exhibit increased susceptibility to defaulting [10].

The hospital based approach has its demerits as a "one-size-fits-all approach" and the need to improve upon this approach in order to meet up with the United Nations global target goal of 90-90-90 on HIV/AIDS epidemic control necessitated differentiated models of care and introduction of Community-based Antiretroviral Therapy (CPARP) models using Community Pharmacy ARV Refill Program (CPARP) as a mode of community-based model [12,13].

However, there is a need to evaluate the pros and cons as well as success of some of the ongoing CPARP especially in the aspect of using community pharmacies as pick-up centers and compare it against the conventional pick-up centers (hospital-based) because of its seeming disadvantages like potential stigmatization effect by people that knows the patients, procrastinations, failure to do bleeding tests and patient-targeted counselling among a host of other factors that can challenge the effectiveness of CPARP [14]. The full extent of the improvement in adherence to ART that may be associated with the introduction of CPARP through community pharmacies compared to hospital based is somewhat lacking in the Nigeria literature context as there are little or no study that focus on the comparison between these two approaches.

In the unique context of Nigeria, characterized by high poverty levels and diverse biosocial factors influencing adherence and default, the introduction of a community-based Antiretroviral therapy approach aims to address individual-related factors, reducing costs and improving accessibility. However, the dearth of reliable data on comparative studies between CPARP compared to the hospital-based approach is scanty as majority of the studies conducted in the area of CPARP were only highlighting the advantages of integrating community pharmacies in ART care, thereby leaving a wide gap in studies comparing the centralized/facility based and differentiated mode of care through approach to ART program.

This study therefore aimed to determine ARV therapy adherence among patients using community pharmacies and Eleta Hospital in Ibadan, Nigeria as their HIV-focused pick-up center in Ibadan, Nigeria: a comparative study.

Materials and Methods

Study area

The study was carried out in Ibadan, the capital of Oyo State. Ibadan is in Southwestern Nigeria with latitude and longitude 7.3775°N, 3.9470° E. It is reported to be the largest indigenous city in Africa. Ibadan was the center of administration of the old Western Region of Nigeria since the days of the British colonial rule (8). It is situated 78 miles inland from Lagos and is a prominent transit point between the coastal region and the areas to the north. Parts of the city's ancient protective walls still stand today, and its population is estimated to be about 3,800,000 [15]. The principal inhabitants of the city are the Yoruba's [16].

Study population

The target population for this study was HIV patients receiving ART at the University College Hospital (UCH), Ibadan who opted to take refills at Eleta Hospital, Ibadan (a secondary facility), and those taking refills at the community pharmacy of their choice. The clinic as at the time of study had approximately 6339 registered patients, while the number of community pharmacies used as refill or pickup centers is 24 with approximately 60 patients respectively.

Study design

A cross-sectional study was conducted employing quantitative techniques with dual focus study areas of facility-based and community-based cross-sectional surveys using a record review guide. This study design is suitable because there is a need to use the secondary data that are available in those selected pick-up centers to document the rate of adherence.

Inclusion criteria

The criteria include patients aged 18-80 as at ART initiation and those that commenced ART at least six months prior to the research period in both facilities.

Exclusion criteria

Records of patients with missing information on any of the outcome or independent variables were excluded from the analysis.

Sampling technique

Joint purposive and snowballing sampling techniques were used to identify the individuals and facilities best suited to answer the research questions. A total of 373 patients at 10 community pharmacies and 227 patient records at Eleta secondary facility were reviewed.

Study instruments

The record review guide was developed prior to the commencement of data collection in line with the adherence rate information expected on the attendance of the selected facility and community pharmacies. The two sections that were included in the tool in this study were pharmacies prescription refills and medication possession ratio. The pharmacy prescription refills show records of designated patients (pseudonyms), the number of pills dispensed and dispensing date while medication possession ratio shows the amount of time everyone was in possession of their drugs after collecting it from the refill pick-up centers. Adherence is determined by Medication Possession Ratio (MPR) the total days' supply in period and Possible limitations include Medication hoarding. Patients may refill their prescriptions but stockpile medications instead of taking them as prescribed.

The data collection period for this study is from 5th October 2021 to 10thNovember 2022.

Data management and analysis

Data collected was coded following a predesigned coding guide and analyzed using Statistical Packages SPSS version 25. Data was cleaned for inconsistencies before analysis. The aspect of the data carrying socio-demographics and frequency was processed. Descriptive statistics were used to examine the distribution and frequencies of the variables. Additionally, inferential statistics, such as the Chi-square test and logistic regression analysis, were employed to uncover significant associations between socio-demographic characteristics and medication adherence rates while logistic regression analysis aimed to determine significant associations between the socio-demographic characteristics (independent variables) and medication adherence rates (binary outcome variable: Adherence (1) and Default (0)) among patients utilizing these healthcare facilities. Adjusted odds ratios (AORs), with their respective 95% confidence interval (95% CI) were estimated for the factors included in the model. The level of statistical significance was set at 5%. All results were presented with tables and charts.

Validity and reliability of instruments

There was an extensive review of the literature to ensure appropriate content and face validity for the record review guide that was used to harvest the adherence rate.

Ethical Statement

The study obtained ethical approval from Oyo State Ministry of Health Research Ethics Committee. Informed consent was obtained from respondents before administration of questionnaires. The participants were informed that their participation was voluntary and that they would not face any consequences for choosing not to participate.

The data collected was strictly confidential and used only for research purposes. All the research assistants underwent training to learn how to maintain confidentiality of information. There was little or no risk to the respondents because the study did not utilize any invasive technique. Therefore, no physical harm was inflicted on study participants because they participated in this study.

Results

Sociodemographic characteristics of the patients

The records of 373 patients at 10 community pharmacies and 227 patients' records at Eleta secondary facility were reviewed for this study. The median (interquartile range) age of the participants was 37.35. Overall, 393 (65.5%) were females; 265 (71.2%) utilized community pharmacies, while 128 (56.4%) used the general hospital. In addition, 305 (50.8%) were aged 38years and above, 400 (66.8%) were married Most patients in both settings belonged to the Yoruba ethnic group, with percentages of 94.2% in community pharmacies and 96.5% in the general hospital. In terms of HIV medication status, the adherence rate was recorded to be high in both facilities among patients who are self-employed or employed compared to those who are retired or unemployed. The general hospital had a higher percentage of patients' adherence to HIV medication (94.0%), while community pharmacies had a higher percentage of patients who defaulted on their medication (17.0%) (Figure 1).

The results of the chi-square test in table 1 also indicate significant associations between the socio-demographic variables and the facilities since their p-values (< 0.001) are lower than the 5% level of significance. However, there is no significant association found between ethnicity and the facilities. Additionally, there is a significant association between HIV medication status and the facilities at the 5% level of significance.

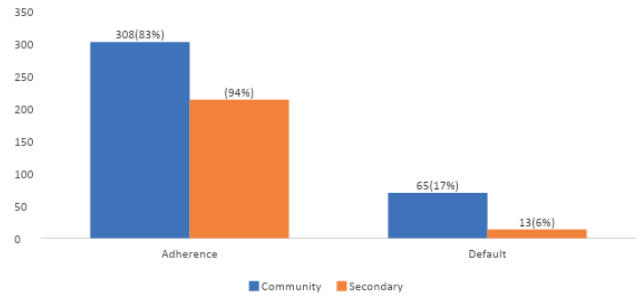

Figure 1: Adherence and default rate among the patients accessing ART in the community pharmacies and Eleta Hospital in Ibadan.

Table 2 indicates male patients had approximately 2.43 times the odds of HIV medication adherence compared to female patients (Reference Category). This difference in odds was statistically significant at the 0.05 level, indicating a notable association (AOR = 2.426, 95%CI = 1.369 – 4.299, p = 0.002). Yoruba patients had roughly 0.49 times the odds of HIV medication adherence compared to patients from other ethnicities. This difference in odds was statistically significant at the 0.05 level, suggesting a significant association (AOR = 0.488, 95%CI = 0.263 – 0.907, p = 0.023). Married patients had approximately 0.36 times the odds of HIV medication adherence compared to patients who were divorced or widowed (Reference Category). This difference in odds was statistically significant at the 0.05 level, indicating a significant association (AOR = 0.357, 95%CI = 0.208 – 0.614, p < 0.001).

Association between socio-demographic factors and adherence rate in the community pharmacies and Eleta secondary Hospital in Ibadan.

Table 3 suggests that patients who were self-employed or employed had approximately 0.19 times the odds of HIV medication adherence compared to patients who were retired or unemployed. This difference in odds was statistically significant at the 0.05 level, indicating a notable association (Odds Ratio = 0.194, 95% CI = 0.055 – 0.685, p = 0.011). However, for other variables the difference in odds was not statistically significant at the 0.05 level.

Table 4 suggests that male patients had approximately four times the odds of HIV medication adherence compared to female patients. This difference in odds was statistically significant at the 0.05 level, indicating a notable association (Odds Ratio = 4.082, 95%CI = 2.072 – 8.040, p < 0.001). Yoruba patients had approximately 0.40 times the odds of HIV medication adherence compared to patients from other ethnicities. This difference in odds was statistically significant at the 0.05 level, suggesting a significant association (Odds Ratio = 0.395, 95%CI = 0.183 – 0.852, p = 0.018), while married patients had approximately 0.27 times the odds of HIV medication adherence compared to patients who were divorced or widowed (Reference Category). This difference in odds was statistically significant at the 0.05 level, indicating a significant association (Odds Ratio = 0.274, 95%CI = 0.142 – 0.530, p < 0.001). However, for other variables the difference in odds was not statistically significant at the 0.05 level.

Discussions

This study offers valuable insights into the socio-demographic characteristics of patients accessing Antiretroviral Therapy (ART) in community pharmacies and a General Hospital in Ibadan. Variations in ART utilization based on age, sex, marital status, educational status, and employment status were observed. The adherence rate in community facilities was found to be 83%, while in secondary facilities, it was notably higher at 94%. These findings align with a similar study conducted by [17] in Ilorin, Nigeria, which reported an adherence rate of 92.6% among HIV patients in a tertiary hospital. It is worth noting that achieving adherence rates between 90% and 95% is vital for successful viral suppression and treatment effectiveness, as emphasized by previous studies [5,6]. However, the current study reveals suboptimal adherence in community facilities, with approximately two out of 10 HIV patients potentially experiencing high viral loads due to ARV dosage defaulting. The community-based approach shows promise in promoting adherence, likely attributed to the increased accessibility and convenience of ART services. Nevertheless, challenges in the community setting, such as lack of support and limited healthcare access, contribute to higher default rates [18]. In contrast, the secondary setting demonstrates

Table 1: Socio-demographics characteristics of patients assessing ART in the community pharmacies and Eleta Hospital in Ibadan.

Socio-demographic characteristics	Community pharmacies (%)	General Hospital (%)	Total (%)	Chi-square	P-value
Age group (Years)					
<38	157(42.1)	138 (60.8)	295(49.2)	19.75	<0.001
≥ 38	216(57.9)	89 (39.2)	305(50.8)		
Median	47.54	32.65			
Sex					
Male	108(28.8)	99(43.6)	207(34.5)	14.75	<0.001
Female	265(71.2)	128(56.4)	393(65.5)		
Ethnicity					
Yoruba	339(94.2)	219(96.5)	558(95.1)	1.58	0.209
Others	34(5.8)	8(3.5)	42(4.9)		
Marital status					
Single	34(8.9)	11(4.8)	45(7.3)	81.49	<0.001
Married	199(53.5)	201(88.5)	400(66.8)		
Divorced/Widowed	140(37.6)	15(6.6)	155(25.9)		
Educational status					
Non-formal /Primary	74(19.6)	114(50.7)	188(31.4)	63.06	<0.001
Secondary/Tertiary	299(80.4)	113(49.3)	412(68.6)		
Employment Status					
Self-employed/Employed	357(96.0)	200(88.1)	557(93.0)	13.37	<0.001
Retired/Unemployed	16(4.0)	27(11.9)	43(7.0)		
HIV Medication Status					
Adherence	308(83.0)	214(94.2)	522(87.0)	20.34	<0.001
Default	65(17.4)	13(5.7)	78(13.0)		

Table 2: Association between HIV medication adherence rate and sociodemographic characteristics of HIV patients utilizing community and secondary health facility pharmacies in Ibadan.

Variables	Levels	Odds Ratio	95% C.I. for Odds Ratio		P-value
			Lower	Upper	
Age group	< 38	0.623	0.371	1.046	0.073
	≥ 38 (RC)				
Sex	Male	2.426	1.369	4.299	**0.002***
	Female (RC)				
Ethnicity	Yoruba	0.488	0.263	0.907	**0.023***
	Others				
Marital Status	Single	1.013	0.436	2.352	0.977
	Married	0.357	0.208	0.614	**0.000***
	Divorced/ Widowed				
Educational Status	Non-formal /Primary	0.903	0.567	1.437	0.666
	Secondary/ Tertiary				
Employment Status	Self-employed/ Employed	0.578	0.3	1.115	0.102

Table 3: Association between HIV medication adherence and sociodemographic characteristics of HIV patients utilizing Eleta secondary Hospital in Ibadan.

Variables	Levels	Odds Ratio	95% C.I. for Odds Ratio		P-value
			Lower	Upper	
Age group	< 38	0.399	0.118	1.343	0.138
	≥ 38 (RC)	1			
Sex	Male	0.281	0.032	2.438	0.25
	Female (RC)	1			
Ethnicity	Yoruba	0.732	0.19	2.819	0.65
	Others				
Marital Status	Single	0	0		0.998
	Married	0.444	0.143	1.38	0.159
	Divorced/ Widowed (RC)	1			
Educational Status	Non-formal / Primary	1.38	0.433	4.396	0.586
	Secondary/ Tertiary (RC)	1			
Employment Status	Self-employed/ Employed	0.194	0.055	0.685	**0.011***
	Retired/ Unemployed (RC)	1			

Table 4: Association between HIV medication adherence rate and sociodemographic characteristics of HIV patients utilizing community pharmacies in Ibadan.

Variables	Levels	Odds Ratio	95% C.I. for Odds Ratio		P-value
			Lower	Upper	
Age group	< 38	0.684	0.367	1.275	0.232
	≥ 38 (RC)				
Sex	Male	4.082	2.072	8.04	**0.000***
	Female (RC)				
Ethnicity	Yoruba	0.395	0.183	0.852	**0.018***
	Others				
Marital Status	Single	0.997	0.362	2.744	0.995
	Married	0.274	0.142	0.53	**0.000***
	Divorced/ Widowed				
Educational Status	Non-formal / Primary	0.781	0.454	1.344	0.373
	Secondary/ Tertiary				
Employment Status	Self-employed/ Employed	1.066	0.457	2.486	0.883
	Retired/ Unemployed				

lower default rates, highlighting the benefits of specialized care and monitoring provided in hospitals or clinics. Given these findings, it becomes essential to adopt a combined approach that capitalizes on the strengths of both settings to enhance treatment outcomes. Addressing adherence barriers in the community, along with continuous support, is crucial for improving adherence rates. Healthcare providers should consistently assess and optimize the ART delivery system to enhance adherence and overall health outcomes for patients with HIV/AIDS. Tailoring interventions to meet individual patient needs will play a pivotal role in achieving better treatment adherence and ensuring improved health outcomes for all affected by HIV/AIDS [18].

The adherence rate was recorded to be high among patients who are self-employed or employed compared to those who are retired or unemployed. This implies that their work routines may facilitate better adherence. Healthcare providers should consider employment-related factors, such as work schedules and stress levels, when designing adherence support programs. The findings also demonstrate a mix of statistically significant and non-significant associations between sociodemographic characteristics and medication adherence rates. Firstly, the lack of statistical significance for the association between age and adherence indicates that age alone might not be a strong predictor of medication adherence in this context. However, it is essential to interpret this result with caution as age could still play a role in adherence behavior when considered alongside other factors not captured in this study. Previous research has shown mixed findings regarding the impact of age on medication adherence, and some studies have reported that younger age groups may face unique challenges, such as treatment complexity and psychosocial factors, affecting their adherence [19].

On the other hand, the statistically significant association between sex and medication adherence is note worthy. Male patients had better adherence to HIV medication compared to female patients. This finding aligns with existing literature that suggests women may experience more barriers to adherence, including family and societal responsibilities, stigma, and reproductive health concerns [20,21]. This finding is not consistent with some previous studies that have observed better adherence among women living with HIV [17]. Addressing gender-specific barriers and tailoring interventions accordingly could lead to improved adherence rates among female patients.

The significant association between ethnicity and medication adherence is another important finding. Yoruba patients had lower odds of adherence compared to patients from other ethnicities. This result highlights the need to consider cultural and ethnic differences in healthcare practices, beliefs, and communication styles that may influence medication adherence [22]. Culturally sensitive interventions and patient education efforts should be developed to overcome barriers specific to the Yoruba community and other ethnic groups [23].

Regarding marital status, the statistically significant association indicates that married patients had lower odds of adherence compared to patients who were divorced or widowed. This finding may be influenced by factors such as spousal support, social dynamics, and marital satisfaction, which can impact treatment adherence [17]. Healthcare providers should recognize the potential challenges faced by married patients and involve spouses in adherence support programs.

Contrary to expectations, educational status did not show a significant association with medication adherence. Patients with non-formal or primary education had slightly lower odds of adherence compared to those with secondary or tertiary education. While the result is not statistically significant, it highlights the need for targeted educational interventions tailored to the diverse educational backgrounds of patients [24].

Lastly, employment status did not show a statistically significant association with medication adherence. Patients who were self-employed or employed had slightly lower odds of adherence compared to retired or unemployed patients. This result may indicate that employment status alone might not be a strong predictor of adherence behavior, but other factors related to work demands, job stability, and access to healthcare could play a role [25].

The study's findings provide valuable insights into the association between HIV medication adherence/default rates and various sociodemographic characteristics of patients accessing care in community and secondary health facilities in Ibadan. Among patients using secondary health facilities, age, sex, ethnicity, marital status, and educational status do not significantly impact HIV medication adherence, except for employment status, which shows a significant association. Patients who are self-employed or employed have higher odds of adherence compared to those who are retired or unemployed. This implies that their work routines may facilitate better adherence. Healthcare providers should consider employment-related factors, such as work schedules and stress levels, when designing adherence support programs. Adopting a patient-centered approach with tailored interventions and comprehensive support systems is essential to improve HIV care and address adherence challenges effectively in these contexts, considering the complex and multifaceted factors influencing medication adherence behaviors.

Conclusions

Both community-based and facility-based pick-up centers have the potential of improving adherence rates among PLWHIV in Nigeria. The need for a patient-centered approach to medication adherence is very vital. Healthcare providers should recognize the heterogeneity of factors influencing adherence and tailor interventions based on individual patient needs. Moreover, this study provides baseline information for further research and vital information for HIV program implementers planning to decentralize the management of stable antiretroviral therapy clients.

Acknowledgements

I am grateful to my lecturers and my project supervisor at Texila American University for their expertise and assistance all through my research period and for their input in writing this manuscript. I would also like to thank my loving family for their support and understanding.

Statement of Ethics

Study approval statement: This study protocol was reviewed and approved by the Ministry of Health, department of planning, research, and statistics division. (UI/UCH Ethics Review Committee),) (approval number (AD 13/479/4045)).

Consent to participate statement: Written informed consent was obtained from participants to participate in the study.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Funding Sources

This study was not supported by any sponsor or funder.

Author Contributions

Both authors significantly contributed to the writing of this manuscript for publication.

Odunayo Betty Olaleye analyzed the data and prepared the manuscript.

Olayinka Stephen Ilesanmi review and edit.

Both authors approved the final manuscript.

Data Availability Statement

All data generated or analyzed during this study are included in this article. Further enquiries can be directed to the corresponding author.

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