Original Article

Antiretroviral therapy adherence and predictors to adherence in Albania: a cross-sectional study

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Abstract

Introduction: The possibility of an HIV/AIDS epidemic in southeastern Europe (SEE) is not improbable. Thus, an understanding of the current issues surrounding HIV/AIDS care, specifically antiretroviral therapy (ART) adherence, in countries within SEE is critical. This study was conducted to determine the ART adherence characteristics of Albania's HIV-positive population.

Methodology: This cross-sectional study reports initial demographic and adherence characteristics of patients receiving HIV/AIDS treatment in Albania. Retrospective review of pharmacy medications dispensed supplemented reported adherence behavior. Further, an adherence index was utilized to explore adherence more thoroughly.

Results: Patient-reported adherence and pharmacy review showed adherence levels of 98.9±4.4% and 97.7±4.7%, respectively. Assessment by adherence index revealed an index level of 91.7±6.7. Factors associated with a score of < 95 on the adherence index were: being partnered (OR = 0.29, 95% CI = 0.09 – 0.98), history of depression (OR = 0.24, 95% CI = 0.08 – 0.76), increased number of barriers to care (OR = 0.80, 95% CI = 0.66 – 0.97), and increased number of current social and medical needs (OR = 0.72, 95% CI = 0.58 – 0.91).

Conclusions: Interventions aimed at reducing barriers to care, addressing current medical and social needs, and treating mental health issues may help improve adherence to ART in patients with HIV/AIDS in Albania. With little known about HIV/AIDS in SEE, this study provides guidance on how SEE countries can help prevent a possible rise in the prevalence of HIV given the close link of ART adherence and spread of HIV.

Key words: Albania; HIV/AIDS; adherence; antiretroviral; survey

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Introduction

Albania, a country in southeastern Europe (SEE) with 3.2 million people, has thus far avoided the HIV epidemic affecting the majority of Eastern Europe [1-6]. Albania's HIV prevalence is < 0.1%, as reported by the Albanian Ministry of Health (MoH); through 2013, 671 cumulative HIV cases were reported in Albania [7-9]. However, the MoH acknowledges the prevalence is likely higher, and a molecular epidemiological study suggests the prevalence may be as high as 1.3% or 150-fold that of current estimates [10-18]. The predominant strain of HIV in Albania is HIV-1A, which differs from the many surrounding countries, including Greece, Italy, Serbia, and Montenegro, where epidemics are being driven by HIV-1B [11,19]. The primary mode of transmission within Albania is noted to be through heterosexual contact [12,13,17]. The absence of a proper surveillance system, variability in HIV prevalence, and a favorable environment for HIV transmission in a changing Albanian sociopolitical climate make determining the characteristics of an Albanian epidemic essential [19]. Proper interventions can be implemented to avoid further spread of HIV within and outside of Albania by understanding the local epidemic.

Antiretroviral therapy (ART) reduces HIV-related morbidity and mortality, decreases viral load and spread of HIV, and can alter the risky behaviors of HIV-patients [20-29]. Expansion of ART into resource-limited countries has occurred in the last decade, yet coverage is still low in many parts of the world, including Eastern Europe, which only reports 23% ART coverage [30-34]. It is necessary to assess

barriers to access to care, and adherence to ART, especially with plans to increase worldwide availability of ART in the coming years and the recent recommendations from the World Health Organization to initiate ART at ≤ 350 CD4 cells/mm^3 [22, 35-38]. Optimal adherence to ART is recommended to be ≥ 95%, as measured by patient recall of ART taken, to help slow progression to AIDS and decrease the risk of ART-resistant strains of HIV [34,39,40]. While there is data that supports the benefits of ART adherence in resource-limited countries, which is generalizable around the globe, there is minimal information on adherence in countries in SEE—the gateway between Eastern Europe and Western Europe, Asia, and Africa. Such deficiencies of data-driven understanding could have profound implications for HIV infection and its epidemiology and treatment [19,41]. Knowledge gleaned from studies within these countries could both help prevent further spread of HIV within the given country as well as provide insight into the epidemics in other countries within SEE.

Predictors of adherence to ART have been well documented [34,42-46]. Numerous barriers to care, and current medical and social needs have been demonstrated amongst HIV-positive patients in Albania [47]. This study aims to explore ART adherence in the HIV-positive population in Albania along with determining predictors of and barriers to adherence. The ultimate goal is to gain an initial perspective on adherence through the lens of how potential clinical or policy improvements may mitigate treatment should a larger epidemic arise in this region.

Methodology

Ethics Statement

Approval for the study was granted from the Stanford University Institutional Review Board and the Albanian Ethical Committee. Informed written and oral consent was obtained from each participant prior to enrolling in the study.

Study Setting

The study was undertaken at the University Hospital Center of Tirana (UHCT) HIV/AIDS Ambulatory Clinic, as previously described [10,47]. Since 2004 this clinic has been the sole site offering ART in Albania [13]. ART is given free of charge on a monthly basis, or a bimonthly basis if the patient lives outside of Tirana and must commute to UHCT. At the time of this study ART was initiated when the CD4 count was less than 200 cells/mm^3. This clinic serves the majority of HIV-positive patients in Albania.

Patient Population

There have been approximately 650 non-pediatric patients that have initiated HIV/AIDS medical treatment at the UHCT HIV/AIDS Ambulatory Clinic since 1994. During the time of this study (June 2009 – August 2009), there were 85 patients that received HIV medical care at UHCT, which represented the majority of patients under care at this site during the study time period. Of those, 79 agreed to participate in the study (93%); 68 of those patients were on ART. Patients unwilling to participate in the study (n = 6) were excluded. An on-site psychologist obtained oral and written informed consent in Albanian. Patients were given 400 Leke (~ $5 USD) for participation.

Survey

Other parts of the survey used in this study along with the steps taken to ensure proper translation into Albanian were described previously [10,47]. The adherence section of the survey was adapted from the survey on adherence from the AIDS Clinical Trials Group (ACTG) (Appendix 1) [48]. This ACTG adherence survey has been validated for use in developing countries and has been shown to perform as well as electronic drug monitors (EDMs) in relating adherence to RNA plasma concentrations of HIV [49,50]. The survey was given in the form of semi-structured interviews with responses being both multiple-choice and patient generated.

Pharmacy Record Review

To complement the survey data, a retrospective review of pharmacy records was conducted for each patient. The number of antiretroviral medications prescribed at each of the last three visits was compared to the dates on which the patients came to refill their prescriptions. Patients who came in to refill their ART at ≤ 1 month, or ≤ 2 months if the patients lived outside of Tirana, were considered 100% adherent. Patients that did not return within a month of their last ART refill had their adherence rate calculated by the following formula over three consecutive months:

$$A = \frac{T_m}{T_v} \times 100$$

Where: A = adherence; T_m = # days medication given; T_v = # days between visits

Statistical Methods

Data was coded and stored electronically. Ten percent of the data was reentered to check for errors; none were identified. Two indices were developed to contribute to the analysis of adherence. These were termed as barriers index, which varied numerically from 0 – 18, and a needs index, which varied numerically from 0 – 9. Each index number that was assigned to an individual patient was derived from the number of questions answered "yes" in appendix 2 – the barriers index is derived from question 2 and the needs index is derived from question 1. For example, if a patient answered yes to needing "HIV medical services" and "assistance with finding meals or food," the patient was assigned a needs index value of two. Each index was then treated as a continuous variable in analysis. The development of the indices along with their parameters was described previously [10, 47]. SAS 9.1.3 was used to analyze the data.

Adherence

In this study, adherence was defined in two ways. The first method was the percentage of prescribed medications that the patient reported taking over a four-day period. Using this definition, patients were dichotomized into adherent versus non-adherent groups, with adherent being defined as taking ≥ 95% of the medication doses out of total medication doses prescribed, where 0% indicates that the patient took none of the medication and 100% is where the patient took all of the doses of the medication prescribed. The second method is an index, described in-depth below, that includes the parameter of the adherence percentage above, but also includes: how closely the patient followed special instructions, date of the last missed dose, and timing of medication dosage.

Adherence was determined initially from the four-day recall. This standard method for determining adherence is [51]:

$$A = \frac{D_p - D_m}{D_p} \times 100$$

Where: A = adherence; Dp = prescribed doses; Dm missed doses;

Adherence for each patient was calculated and aggregated (averaged) for the entire population. The results are expressed in proportions with standard deviations. The method of dichotomization for four-day recall is mentioned above.

A recent principal component analysis of the ACTG 5-item survey showed that this questionnaire correlates better with HIV plasma RNA levels than the four-day recall alone. The questionnaire also correlates better with CD4 counts and predicts adherence similar to EDM. Thus, a multivariable method of analysis to construct an index of adherence was also used [48,49]. The formula used to develop the index is [49]:

$$A = 100 \times (0.65 + (2.15 \times adhd1) + (2.21 \times adhd2) + (2.07 \times adhd3) + (1.99 \times adhd4) + (0.37 \times follwsch) + (0.36 \times instrfu) - (0.13 \times lastskip))/11.99$$

The variables in the above equation are defined as the following questions in section II of the survey: question 1 (*adhd1 – adhd4*), question 2 (*follwsch*), question 3 (*instrfu*), and question 4 (*lastskip*). These questions can be seen in appendix 1. The result of this analysis produced an index from 0 – 100 that is not an adherence percentage. The values attained from the index are reported as a mean and associated standard deviation. Ranges and median are also reported. The index was dichotomized so that ≥ 95 is considered adherent and < 95 is considered non-adherent. This does not have a specific clinical correlation, but the cutoff for adherence in recall methods is generally set at ≥ 95%; moreover, the higher a patient is on the adherence index the more likely they are to have a lower viral load and higher CD4 count [49]. This dichotomized approach was used to assess variables that are associated with adherence and was not related to a clinically significant cutoff value.

Factors Associated with Adherence

In determining variables that are associated with adherence, both the four-day recall of medication adherence and the adherence index were used in separate analyses. The dichotomous separation of adherent and non-adherent in both analyses was used due to the severe non-normality of the data. Dichotomization of the four-day recall and adherence index is described above. The association of categorical variables with adherence was evaluated with chi-squared tests unless any cell in the contingency tables had n < 5, in which case Fischer's Exact Test was used. For continuous variables, comparisons were done with the t-test or Wilcoxon Rank Sum Test depending on the normality of the data. Factors associated with adherence (in the adherence index) in the crude bivariate analysis with p < 0.15 were entered into a multivariable logistic regression analysis that was adjusted for variables that often confound adherence measures: age, gender, and year of education [52]. Adjusted odds ratios with 95% confidence intervals are reported. Variables were assessed for collinearity before inclusion in the model.

Table 1. Antiretroviral adherence of patients at UHCT

Adherence measure	Level of adherence (n=68)
Four-day patient recall, mean (SD), *%*	98.9 (4.4)
Median (Range), *%*	100 (75 – 100)
Pharmacy record review, mean (SD), *%*	97.7 (4.7)
Median (Range), *%*	100 (78.6 – 100)
Adherence Index *, mean (SD)	91.7 (6.7)
Median (Range)	92.7 (65.5 – 100)

*Adherence Index is defined in the methods section and includes four-day recall, last ART dose missed, and special instructions followed

Barriers to Adherence

The number of patients reporting specific barriers to adherence was reported as a percentage. The barriers were reported in a highest rated barrier order. Possible interventions to increase adherence were also reported in the same fashion.

Persistence

Pharmacy records were reviewed to determine how many patients on ART at the UHCT HIV/AIDS Ambulatory Clinic during January 2008 – August 2009 missed more than one month of ART. The length of time that patients missed their ART was determined and averaged both with and without patients that were known to have emigrated from Albania.

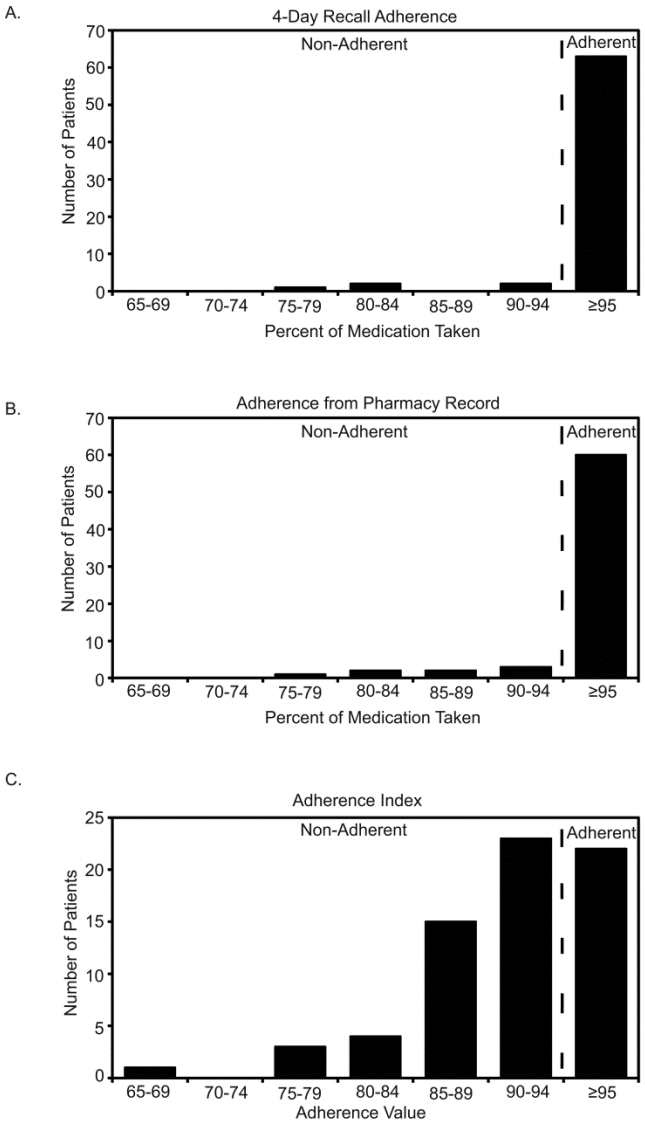
Results

Adherence

The average adherence rates differ slightly across the three methods for assessing adherence (Table 1). Adherence measured by the four-day patient recall and the pharmacy review of records were relatively similar, 98.9±4.4% and 97.7±4.7%, respectively. Adherence expressed in the adherence index was 91.7±6.7, as is expected from its function in increasing variability of adherence.

When adherence was assessed by four-day recall of medication taken, there were only five patients that were considered non-adherent (Figure 1A). Although non-adherent individuals were few, factors associated with non-adherence include: having a partner (married or cohabiting) ($p = 0.05$), having lived abroad for longer periods of time ($p = 0.04$), having obtained ART abroad ($p = 0.04$), and having had the diagnosis of HIV for longer time periods ($p = 0.03$) (Supplementary Table 1). No further analysis was completed with the four-day recall data because of the limited number of non-adherent respondents. Pharmacy review of ART produced similar results as to the number of patients that were considered non-adherent, thus giving additional validity to the results of the four-day recall adherence measure (Figure 1B).

Figure 1. The dashed-line in the figures distinguishes the adherent group from the non-adherent group. **A**) Patient adherence to ART based on four-day recall adherence; **B**) Patient adherence to ART based on pharmacy record; **C**) Patient adherence to ART as determined by the adherence index. The adherence index takes into account four-day patient recall of medication taken, timing of doses, last missed ART dose, and ability to follow medication instructions.



When adherence was assessed with the adherence index, the number of patients considered non-adherent increased to 46 (Figure 1C). Factors associated with non-adherence were: being married as opposed to being single or cohabitating with a sexual partner (p = 0.04), having a history of diagnosed anxiety after diagnosis with HIV (p = 0.05), having a history of diagnosed depression after diagnosis with HIV (p = 0.009), having an increased number of barriers to care (p = 0.03), and having an increased number of current social and medical needs (p = 0.0008) (Table 2).

In a multivariate logistic regression model with adjustment for age, gender, and years of education, the following factors were associated with a lower odds of being adherent: having a partner (married or cohabitating) (OR = 0.29, 95% CI = 0.09 – 0.98), having a history of depression following HIV diagnosis (OR = 0.24, 95% CI = 0.08 – 0.76), increasing number of barriers to care (OR = 0.80, 95% CI = 0.66 – 0.97), and increasing number of current social and medical needs (OR = 0.72, 95% CI = 0.58 – 0.91). The multivariate logistic regression model was adjusted for age (p = 1.00), gender (p = 0.71), and years of education (p = 0.07) because these factors that

Table 2. Associations of adherence of patients receiving antiretroviral medication at UHCT HIV/AIDS Ambulatory Clinic by adherence index

Characteristic	Adherent (n=22)	Non-adherent (n=46)	*P* Value
Age, mean (SD), *y*	42.0 (14.9)	39.5 (9.8)	1.00
Median (Range), *y*	40.5 (23 – 79)	38.5 (18 – 64)	
Female, No. (%)	8 (36.4)	15 (32.6)	0.76
Heterosexual, No. (%)	20 (90.9)	43 (94.5)	0.66
Married, No. (%)	7 (31.8)	27 (58.7)	**0.04**
Partnered, No. (%)	8 (36.4)	27 (58.7)	0.09
> Higher (12 Classes), No. (%)	6 (27.3)	4 (8.7)	0.07
Muslim, No. (%)	16 (72.7)	39 (84.8)	0.32
Years abroad, mean (SD), *y*	2.8 (5.0)	2.8 (4.8)	0.99
Median (Range), *y*	0 (0 – 16)	0 (0 – 17)	
Obtained ART abroad, No. (%)	3 (13.6)	2 (4.4)	0.32
Years since diagnosis, mean (SD), *y*	2.6 (2.7)	2.9 (3.3)	0.89
Median (Range), *y*	2 (0 – 11)	2 (0 – 16)	
Employed/Student/Retired, No. (%)	8 (36.4)	23 (50.0)	0.29
Arrested ≥ 24 hours, No. (%)	7 (31.8)	10 (21.7)	0.37
Ever tried drugs, No. (%)*	1 (4.6)	5 (11.1)	0.66
Attained HIV through sexual contact, No. (%)	13 (59.1)	19 (41.3)	0.17
Experienced anxiety after HIV diagnosis, No. (%)	15 (68.2)	41 (89.1)	**0.05**
Experienced depression after HIV diagnosis, No. (%)†	9 (42.9)	34 (75.6)	**0.009**
Living with household members with HIV/AIDS, No. (%)*	4 (18.2)	9 (20.0)	1.00
Barrier Index‡, mean (SD), #	6.5 (3.4)	8.4 (2.6)	**0.03**
Median (Range), #	7.5 (1 – 13)	9 (2 – 13)	
Need Index§, mean (SD), #	4.6 (2.2)	6.8 (2.5)	**0.0008**
Median (Range), #	4 (1 – 8)	8 (0 – 9)	

*22 adherent and 45 non-adherent respondents
†21 adherent and 46 non-adherent respondents
‡Barrier Index includes barriers experienced by patients in seeking HIV medical care.
§Need Index includes current needs that patients are having with regard to medical and daily life

Table 3. Multivariate logistic regression on adherence index analysis†

Parameter	OR*	95 % CI	*P* Value
Married‡	0.35	0.12 – 1.03	0.06
Partnered	0.29	0.09 – 0.98	0.05
Anxiety	0.28	0.07 – 1.03	0.06
Depression	0.24	0.08 – 0.76	0.01
Barrier Index	0.80	0.66 – 0.97	0.02
Need Index	0.72	0.58 – 0.91	0.005

*Odds Ratio for being considered adherent.
†Adjusted for age, gender, and years of education.
‡Adjustment for gender and years of education. Age is collinear with marriage.

are common confounders in adherence measures even though two of the factors (age and gender) did not illustrate potential confounding in univariate analysis [52]. Having a history of anxiety or being married was not associated with lower odds of being adherent (Table 3). The multivariate logistic regression model used for marriage was only adjusted for gender and years of education, for age is collinear with marriage.

Of the patients that were on ART from January 2008 – August 2009, 23 patients left therapy for more than one month (Supplementary Table 2). The average time these patients left therapy was 10.4±4.4 months. If patients were excluded that were known to have emigrated from Albania, there were 19 patients that left therapy; on average these patients left therapy for 10.4±4.8 months.

Barriers to Adherence

Patients were also asked about reasons for missing doses of medication and about possible interventions that may be useful in improving adherence. In reporting reasons for missed doses of ART, the most common reasons were: simply forgot (20.6%), were away from home (17.6%), and were busy with other things (17.6%) (Supplementary Table 3A). The most difficult barriers to adherence for patients were: being busy with other things (17.4%), wanted to eliminate side effects (13.0%), ran out of medication (13.0%), and simply forgot (13.0%) (Supplementary Table 3B).

Patients also suggested interventions that could increase the likelihood of not missing any ART doses (Supplementary Table 4A). The most common responses were: more education on the seriousness of HIV/AIDS (37.3%), more education on the reasons for taking medication (32.8%), and not so many pills to take (25.4%). The interventions that were the most important to the patients were related to education and attaining medication in close proximity to their homes (Supplementary Table 4B).

Discussion

Many challenges face patients that are seeking care for HIV/AIDS in Albania, yet this study evidences that once patients reach care, adherence to ART is high [10,13,14,16-18, 47]. Factors contributing to poor medication adherence include being partnered, mental health issues, higher levels of barriers to care, and higher current medical and social needs.

Participation in this study was high (93% response rate) and results suggest that once patients are able to access care, they tend to be adherent and persistent to ART. Patients had high levels of adherence on four-day recall, pharmacy review of records, and the adherence index – 98.9±4.4%, 97.7±4.7%, and 91.7±6.7, respectively (Table 1). These high levels of adherence are encouraging since it seems that patients who received care are motivated to be adherent to their ART. Though there tends to be overestimates of adherence in self-reported measures, the four-day recall and pharmacy review of records showed a strong correlation [48,51,53,54]. Indeed, with the clinical cutoff for adherence being ≥ 95% of ART taken, the vast majority of the patients met this criterion on four-day recall and pharmacy review of records. Adherence based on the adherence index was slightly lower, yet there is, as of yet, no known clinically significant cutoff; so an arbitrary value of ≥ 95 was chosen as being adherent for analysis purposes. Increasing values in the adherence index is predictive of a lower viral load and increased CD4 count [49]. From these results it may be suggested that the HIV-positive population in Albania is likely to be adherent to ART if they are able to overcome the barriers that prevent them from finding medical care.

When factors associated with adherence were analyzed, results differed slightly between the adherence index and the four-day recall of medication taken (Table 2 and Supplementary Table 1). Based on these comparisons, the only value that seems to overlap is that adherence tends to decrease when patients are married or partnered. Patients may be keeping their HIV status concealed from their partners due to the high levels of social stigma associated with HIV in Albania [10,21,47]. This may offer an avenue for intervention with more in-depth counseling on ART and HIV to patients that are married or with a partner. The other differences in the associations may be attributed to the small number of patients that were considered non-adherent on four-day recall of medication taken. With only five patients being non-adherent, this decreases the potential of being able to generalize the results to the entire HIV-positive population in Albania and the power of the statistical analyses. Therefore, for further analysis with multivariable logistic modeling, the adherence index was chosen.

In multivariable logistic regression modeling that was adjusted for age, gender and years of education, a decreased odds of being adherent was associated with being partnered (married or cohabitating), having a history of depression following diagnosis with HIV, having experienced a higher number of barriers to care, and having a higher number of current medical and social needs (Table 3). This suggests that

interventions should be aimed at patients that are partnered or have a history of depression. Also, decreasing the barriers to care that are experienced by patients along with assisting with the current medical and social needs of patients may help to increase adherence to ART.

When patients were asked directly about reasons for missing doses of ART, common reasons were related to forgetting or lifestyle changes (Supplementary Table 3). Patients also supported measures to increase education on the seriousness of HIV and the necessity for taking ART as a means to increase adherence (Supplementary Table 4). Though these represent more direct means of increasing adherence through interventions or education, each can be explored if adherence to ART decreases in Albania.

The necessity for interventions aimed at keeping patients adherent to ART and enrolled in HIV medical services is evidenced by the number of patients that left care between January 2008 and August 2009. Therefore, interventions need to be aimed at patients currently enrolled in HIV medical care programs in Albania to prevent loss to follow-up. The mechanisms that lead to these patients missing therapy were not examined in this study.

Limitations of this study include self-report bias and small sample size. In assessing adherence, self-report methods are commonly used, but tend to be reported as an overestimate [48,51,53,54]. Drug holidays (i.e. not taking medications on weekends) and white-coat adherence (increased adherence before a medical check-up) may also be missed with these measures. Still, self-report methods are used widely in assessing adherence [51]. The correlation between the self-reported adherence and pharmacy review of medications, in this study, offers support for this assessment. The use of the adherence index has also shown to correlate with clinical markers of adherence and was therefore used [49]. The smaller sample size may prevent generalization, yet this study covered the majority of known patients under HIV medical care in Albania during the study period. Results can therefore be expected to apply to patients that are currently attaining care and may inform future patient recommendations.

Of the Albanian HIV-positive population receiving ART treatment, these individuals appear to be largely adherent to ART, yet barriers to care along with medical and social needs are obstacles to patient arrival into the health sector and adherence to ART [47]. Thus, future interventions that may be successful in allowing patients to reach HIV-specialty care in Albania will arise from addressing barriers to care, and medical and social needs of the patient population. This may also have the indirect effect of decreasing transmission of HIV from those affected to those non-affected given the main mode of transmission of HIV in Albania is heterosexual contact. Of note, more attention needs to be paid to patients that are partnered and/or depressed. Structuring of the healthcare sector to address these issues for HIV-positive patients in Albania may aid in sustaining the low HIV prevalence within this country.

Maintaining or increasing the current levels of ART adherence amongst patients in Albania may also have affects across the Balkans along with neighboring Eastern and Western European countries. The changing sociopolitical climate that has occurred in the Balkans and the postwar recovery phases in many of these countries has left them uniquely susceptible to a rapid growing and undetected HIV epidemic [19,41]. Inadequate healthcare infrastructure coupled with the high mobility of these populations offers concern for spread of HIV within and outside of the Balkans, should an epidemic arise. As HIV-1A, the strain most prevalent in Former Soviet countries, is the current dominate strain of HIV in Albania, this is also worrisome to Italy, Greece, Montenegro, Serbia, and other Western European countries where HIV-1B is dominate [11]. Furthermore, the HIV-1B strain is also present in the Balkans and was introduced from multiple sources, resulting in frequent intercountry exchanges and local dispersal, suggesting that the Balkans serves as a gateway between Eastern and Western Europe [19,41]. The introduction of non-predominant strains in any of these countries/regions, including in Albania itself, may alter the current dynamic of the epidemic and lead to unforeseen problems. If the current levels of adherence are sustained and the government/healthcare structure acts to reduce barriers to care in Albania, some of the aforementioned situations may be avoided. ART adherence along with early diagnosis and treatment has been shown to decrease the likelihood of transmission of HIV, an area that Albania has a unique opportunity to effectively address and potentially become a paradigm for HIV diagnosis and treatment in the Balkans [24,25,27,29]. The foundation is laid, but further innovation at the intervention in the clinical and policy levels are necessary to efficiently quell the potential Albanian HIV epidemic.

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Supplementary Items

Supplementary Table 1. Associations of adherence of patients receiving antiretroviral medication at UHCT HIV/AIDS Ambulatory Clinic by four-day recall

Characteristic	Adherent (n=63)	Non-Adherent (n=5)	*P* Value
Age, mean (SD), *y*	39.9 (11.6)	44.4 (13.1)	0.52
Median (Range), *y*	39 (18 – 79)	45 (31 – 64)	
Female, No. (%)	23 (36.5)	0 (0.0)	0.16
Heterosexual, No. (%)	59 (93.7)	4 (80.0)	0.33
Married, No. (%)	30 (47.6)	4 (80.0)	0.36
Partnered, No. (%)	30 (47.6)	5 (100.0)	**0.05**
> Higher (12 Classes), No. (%)	10 (15.9)	0 (0.0)	1.00
Muslim, No. (%)	51 (81.0)	4 (80.0)	1.00
Years abroad, mean (SD), *y*	2.5 (4.6)	6.2 (6.5)	**0.04**
Median (Range), *y*	0 (0 – 17)	3 (0 – 15)	
Obtained ART abroad, No. (%)	3 (4.8)	2 (40.0)	**0.04**
Years since diagnosis, mean (SD), *y*	2.5 (2.7)	6.2 (5.8)	**0.03**
Median (Range), *y*	2 (0 – 13)	5 (2 – 16)	
Employed/Student/Retired, No. (%)	28 (44.4)	3 (60.0)	0.65
Arrested ≥ 24 hours, No. (%)	14 (22.2)	3 (60.0)	0.10
Ever tried drugs, No. (%)*	6 (9.7)	0 (0.0)	1.00
Attained HIV through sexual contact, No. (%)	31 (49.2)	1 (20.0)	0.36
Experienced anxiety after HIV diagnosis, No. (%)	53 (84.1)	3 (60.0)	0.21
Experienced depression after HIV diagnosis, No. (%)†	40 (65.6)	3 (60.0)	1.00
Living with household members with HIV, No. (%)†	11 (17.8)	2 (40.0)	0.25
Barrier Index‡, mean (SD), #	7.7 (3.0)	9 (2.3)	0.44
Median (Range), #	8 (1 – 13)	8 (7 – 12)	
Need Index§, mean (SD), #	6.1 (2.6)	6.4 (2.7)	0.70
Median (Range), #	7 (0 – 9)	8 (3 – 9)	

*62 adherent and 5 non-adherent respondents
†61 adherent and 5 non-adherent respondents
‡Barrier Index includes barriers experienced by patients in seeking HIV medical care.
§Need Index includes current needs that patients are having with regard to medical and daily life.

Supplementary Table 2. Months without therapy of patients missing > 1 month of therapy at UHCT HIV/AIDS Ambulatory Clinic*

Measure	Months (n=23†)
Months without ART, mean (SD), *months*	10.4 (4.4)
Median (Range), *months*	10 (1 – 16)
Months without ART, mean (SD), *months*‡	10.4 (4.8)
Median (Range), *months*‡	11 (1 – 16)

*Data is from the dates 1/1/2008 – 8/1/2009.
†Four of the patients left therapy due to moving to another country.
‡The four patients that moved were removed from the calculation.

Supplementary Table 3A. Barriers to adherence to ART experienced by patients receiving HIV/AIDS medical care at UHCT HIV/AIDS Ambulatory Clinic

Barrier	Population (n=68)
Simply forgot	14 (20.6)
Were away from home	12 (17.6)
Were busy with other things	12 (17.6)
Ran out of pills	10 (14.7)
Had a change in daily routine	9 (13.2)
Felt like the drug was harmful/toxic	5 (7.4)
Fell asleep/slept through dose time	5 (7.4)
Did not want others to notice me taking medication	4 (5.9)
Felt ill or sick	4 (5.9)
Felt better	4 (5.9)
Wanted to avoid side effects	3 (4.4)
Had problems taking pills at specified times (with meals, on an empty stomach, etc.)	2 (2.9)
Had too many pills to take	1 (1.5)
Felt depressed/overwhelmed	1 (1.5)

Supplementary Table 3B. Most difficult barriers to adherence to ART experienced by patients receiving HIV/AIDS medical care at UHCT HIV/AIDS Ambulatory Clinic

Barrier	Population (n=23*)
Was busy with other things, No. (%)	4 (17.4)
Wanted to eliminate side effects, No. (%)	3 (13.0)
Ran out of medication, No. (%)	3 (13.0)
Simply forgot, No. (%)	3 (13.0)
Felt sick, No. (%)	2 (8.7)
Did not want others to see my medication, No. (%)	2 (8.7)
Felt depressed/overwhelmed, No. (%)	2 (8.7)
Was away from home, No. (%)	2 (8.7)
Felt better, No. (%)	1 (4.3)
Fell asleep/slept through dosing time, No. (%)	1 (4.3)

*Some patients responded with more than one barrier that was the most difficult to overcome.

Supplementary Table 4A. Patient reported interventions to increase adherence of patients receiving HIV/AIDS medical care at UHCT HIV/AIDS Ambulatory Clinic

Intervention	Population (n=68)
More education on the seriousness of HIV/AIDS, No. (%)*	25 (37.3)
More education on the reasons for taking medication, No. (%)*	22 (32.8)
Not so many pills to take, No. (%)*	17 (25.4)
Having a reminder of when to take medication, No. (%)	13 (19.1)
Could get medication for free near home, No. (%)	13 (19.1)

*67 Respondents

Supplementary Table 4B. Most important patient reported interventions to increase adherence of patients receiving HIV/AIDS medical care at UHCT HIV/AIDS Ambulatory Clinic

Intervention	Population (n=57*)
More education of the reasons for taking medication, No. (%)	17 (29.8)
Could get medication for free near home, No. (%)	12 (21.1)
More education on the seriousness of HIV/AIDS, No. (%)	10 (17.5)
Having a reminder of when to take medication, No. (%)	10 (17.5)
Not so many pills to take, No. (%)	6 (10.5)
Better quality medications in Albania, No. (%)	2 (3.5)

*Some patients responded with more than one suggestion of an intervention.

Appendix 1.

1. Taking all of your HIV medication is difficult. Below asks about the medications that you may have **MISSED** taking over the last four days. If you did not miss any doses, write a zero (0) in the box. Note that the table asks about DOSES not PILLS. **If you took only a portion of a dose on one or more of these days, please report the dose(s) as being missed. See page 4 for current medication doses.**

HOW MANY DOSES DID YOU **MISS:**				
MEDICATION NAME	Yesterday	2 days ago	3 days ago	4 days ago

2. Most medications need to be taken on a schedule, such as "2 times a day" or "3 times a day" or "every 8 hours." How closely did you follow your specific schedule over the last four days?
   - ☐ Never
   - ☐ Some of the time
   - ☐ About half of the time
   - ☐ Most of the time
   - ☐ All of the time

3. Do any of your medications have special instructions, such as "take with food" or "on an empty stomach" or "with plenty of fluids"?
   - ☐ Yes
   - ☐ No

B) If yes, how often did you follow those special instructions over the last **four** days?
   - ☐ Never
   - ☐ Some of the time
   - ☐ About half of the time
   - ☐ Most of the time
   - ☐ All of the time

4. When was the last time you missed **ANY** of your medications?
   - ☐ Within past 2 days
   - ☐ Within past 2 weeks
   - ☐ 2-4 weeks ago
   - ☐ 1-3 months ago
   - ☐ More than 3 months ago
   - ☐ Never skip medications

Appendix 2.

1. Currently or in the past 12 months, have you needed any of these services related to your HIV/AIDS infection?:

	Have you needed this service in the past 12 months?	If yes, Have you been able to get this service in the past 12 months?
HIV medical services	☐ Yes → ☐ No ☐ Don't know what this means	☐ Yes ☐ No
Psychologist or psychiatric services	☐ Yes → ☐ No ☐ Don't know what this means	☐ Yes ☐ No
Assistance in finding a doctor for ongoing medical services	☐ Yes → ☐ No ☐ Don't know what this means	☐ Yes ☐ No
Assistance in finding shelter or housing	☐ Yes → ☐ No ☐ Don't know what this means	☐ Yes ☐ No
Assistance with finding meals or food	☐ Yes → ☐ No ☐ Don't know what this means	☐ Yes ☐ No
Assistance with completing daily activities or chores	☐ Yes → ☐ No ☐ Don't know what this means	☐ Yes ☐ No
Transportation assistance	☐ Yes → ☐ No ☐ Don't know what this means	☐ Yes ☐ No
Childcare assistance	☐ Yes → ☐ No ☐ Don't know what this means	☐ Yes ☐ No
Education or information on HIV risk prevention	☐ Yes → ☐ No ☐ Don't know what this means	☐ Yes ☐ No

2. Below is a list of problems that you may have had when trying to **get or use** HIV/AIDS medical services. If you experienced any of the following problems, mark "Yes." If you did not have any of the problems did not affect you, mark "No." If you do not know if the problem affected you, mark "Don't Know."

	Yes	No	Don't Know
Did not know that I could get medical help for HIV/AIDS	☐	☐	☐
Did not know where I could find medical help for HIV/AIDS	☐	☐	☐
Too sick to get medical help	☐	☐	☐
Did not think that HIV/AIDS required medical help	☐	☐	☐
Mental problems (like depression, anxiety, dementia, etc.) kept me from getting medical help for HIV/AIDS	☐	☐	☐
People at the hospital or clinic made me feel worse about myself for having HIV/AIDS	☐	☐	☐
People at the hospital or clinic treated me unfairly because of my HIV/AIDS	☐	☐	☐
My doctor or nurse did not know about HIV/AIDS	☐	☐	☐
I had to wait too long to see a doctor for HIV/AIDS	☐	☐	☐
I was afraid to get in trouble with the law and/or police	☐	☐	☐
Did not want people to know I had HIV/AIDS	☐	☐	☐
I was afraid I would lose my job and/or house because of HIV/AIDS			
No transportation available	☐	☐	☐
No childcare available	☐	☐	☐
I was not eligible for the HIV/AIDS medical help	☐	☐	☐
There was too much paperwork	☐	☐	☐
The services cost too much money	☐	☐	☐
There are too many instructions I have to follow	☐	☐	☐
Other (specify)_____	☐	☐	☐