


Evaluating Barriers to Viral Suppression among People with HIV in Santiago, Dominican Republic

Journal of the International Association of Providers of AIDS Care
Volume 21: 1-8
© The Author(s) 2022
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/23259582221096522
journals.sagepub.com/home/jia



Meghan McCarthy¹, Jun Tao, PhD¹, Alain Lerebours, MD²,
Claudia Rodriguez, MD³, Timothy P Flanigan, MD^{1,4},
and Martha C Sanchez, MD^{1,4} 

Abstract

The Dominican Republic (DR) has the second-highest prevalence of HIV infection in the Caribbean, but viral suppression and treatment adherence are not well understood. We conducted a cross-sectional study among people living with HIV/AIDS (PLWHA) to fill in the knowledge gap. Questionnaire was used to collect demographic data, antiretroviral therapy (ART) adherence, and barriers and facilitators to HIV care. Viral load and other clinical information were extracted through chart reviews. Descriptive analyses and logistic regression were conducted to explore factors associated with non-viral suppression and imperfect ART adherence. Of 193 PLWHA 83.9% were virally suppressed. Those that were non-virally suppressed were more likely of being male (odds ratio [OR]: 2.55, 95% confidence interval [CI]: 1.17-5.58) and less likely of being unemployed (OR: 0.28, 95% CI: 0.08-0.96). However, being male (OR: 0.78, 95% CI: 0.40-1.53) and unemployed (OR: 0.28, 95% CI: 0.08-1.21) were less likely to report imperfect adherence. Tailored interventions are needed to improve adherence and viral suppression in DR.

Keywords

Dominican Republic, HIV care continuum, HIV treatment barriers

Date received: 16 September 2021; revised: 30 March 2022; accepted: 30 March 2022.

Introduction

The Human Immunodeficiency Virus (HIV) is a devastating infectious disease that continues to affect Low- to Middle-Income Countries (LMIC) disproportionately.¹ The Caribbean region has the second-highest prevalence of HIV in the world.² The Dominican Republic (DR), shares the island of Hispaniola with Haiti, both countries accounted for 70% of AIDS related death in the region on 2017.³ UNAIDS estimates the prevalence of HIV-infection to be 1% among adults aged 15 to 49 years, with about 67 000 adults and children living with HIV in the DR.⁴ Efforts to increase access of antiretroviral therapy (ART) to HIV-infected individuals and improvement of social protection strategies has reduced the number of new infections by 29% in the Caribbean from 2010-2019. Key populations and their partners or sexual contacts account for 60% of those newly infected.⁵

In 2004, the President's Council on AIDS, the DR Ministry of Health and international non-governmental organizations significantly scaled up the provision of antiretroviral therapy (ART) to people with HIV (PWH) in the DR.⁶ Between 2004

and 2017, the incidence of HIV infections and the number of AIDS-related deaths decreased by 66% and 58%, respectively. Despite these achievements, significant progress must be made to achieve the 90-90-90 targets. Currently, only 53% of PWH have access to ART and only 43% are virally suppressed.⁴

The Ministry of Public Health in the DR has established national guidelines for addressing the epidemic in the DR, which includes ending the AIDS epidemic by 2030, the provision of ART for all PWH, and reduction of new infections by 50% among key populations.⁷ The HIV epidemic in the DR

¹ Brown University, Providence, RI, USA

² Pontificia Universidad Católica Madre y Maestra, Santiago, DR

³ Hospital Regional Universitario Jose Maria Cabral y Baez, Santiago, DR, Dominican Republic

⁴ The Miriam Hospital, Providence, RI, USA

Corresponding Author:

Martha C. Sanchez, Brown University, Providence, RI, USA.

Email: martha.sanchez@lifespan.org



is characterized by several sociocultural challenges which hinder the ability of certain populations to access and adhere to HIV interventions and services.⁸ Despite having the second-highest prevalence of HIV in the Caribbean, there is limited literature on the factors that impact the continuum of care among HIV-infected populations in the DR.²

This is a cross-sectional evaluation of adherence to care and ART, and its association with HIV viral suppression on adult PWH engaged in care at an urban clinic within a public tertiary-care hospital in Santiago, DR. This study aims to understand how adherence interventions can be better targeted for patients in HIV care in the northern region of the DR.

Methods

Study Setting and Participants

A sample of adult PWH were enrolled from the Clínica de Enfermedades de Daños Inmunológicos (CEDI; Clinic of Immunologic Diseases) between June and July 2018. CEDI is an HIV clinic located within the Hospital Regional Universitario José María Cabral y Báez (HRUJM CB), a major public tertiary-care hospital in Santiago, DR. All PWH being followed at the CEDI receive ART and medical consultations free of charge regardless of insurance status. Currently, the clinical staff at the CEDI provide several resources to promote engagement in care, including a peer navigator, a psychologist, and staff members who distribute medications.

Inclusion criteria for participants were: (1) HIV diagnosis, (2) age 18 years or older and (3) receiving antiretroviral therapy for more than 30 days. Informed consent and surveys were provided in Spanish and/or Haitian Creole by trained research staff.

Measures

The primary outcome was HIV viral suppression, defined as having an HIV viral load of less than 200 copies/mL within the last six months. Participants completed a demographics survey, a self-reported adherence assessment and a survey of barriers and facilitators. Clinical data were collected through chart review by the research staff.

Demographic information included age, sex, race/ethnicity, nationality, employment status, medical insurance, time from HIV diagnosis, as well as alcohol and drug use. The self-reported adherence assessment was based on a tool that has been validated for use both in the United States and in South Africa.⁹⁻¹¹ Participants are asked to report the number of doses missed in the last 30 days, how well they adhered to their medications (on a scale of “Very poor, Poor, Fair, Good, Very good, Excellent”), how frequently they adhered to their medications (on a scale of “Never, Rarely, Sometimes, Usually, Almost always, Always”) and how many HIV medical appointments they had missed within the last year.

A survey of barriers and facilitators of participant’s adherence to HIV care was conducted. Finally, clinical data were

extracted from the paper medical records, including most recent viral load, ART regimen prescribed, previous ART prescribed, and presence of psychiatric or medical co-morbidities.

Statistical Analysis

Bivariate analyses were performed to present the distribution of demographics between participants who were virally suppressed (<200 copies/mL) and those who were not virally suppressed (>200 copies/mL). Chi-square tests and Kruskal-Wallis rank tests were used for categorical and continuous variables, respectively. Multivariate logistic regressions were conducted to explore risk factors associated with being not virally suppressed or reporting imperfect adherence. Confounding variables were determined by a priori knowledge. This analysis was conducted using Stata 15.0 (StataCorp, Texas).

Ethical Approval and Informed Consent

The study protocol was approved the Miriam Hospital Institutional Review Board (IRB) in Providence, RI (Review #210218) and the Ethics Committee (EC) at HRUJM CB in Santiago, DR. Both the IRB and EC waived the need for a written informed consent since the only record linking the subject and the research would be the consent document and the principal risk would be potential harm resulting from a breach of confidentiality. Informed consent was obtained verbally before participation and confirmed by an independent witness.

Results

During June and July 2018, 202 PWH were surveyed. 193 (95.5%) had clinical chart data available to review and were included in the analysis. The characteristics of the study population are presented in Table 1. The majority of PWH were women (61.1%), of Dominican nationality (90.1%), uninsured (76.6%), and employed (73.6%). Most participants were in the age group of 35-54 years (59.6%). These characteristics compare to those of the overall CEDI clinic whose HIV patient population is 53% women, 95% of Dominican nationality and has a median age of 47 years. Nearly half (47.4%, n=90) of participants reported having 0-6 years of education, while 42.1% (n=80) had completed 7-9 years of education. About half considered they lived far away from the HIV clinic (49.2%, n=95). More than half of PWH reported the cost of transportation was expensive for them (53.4%, n=103). Most patients stated never (59.1%) or rarely (18.1%) using alcohol in the last month.

Of the 193 study participants, 83.9% (n=162) had achieved HIV viral suppression (HIV RNA viral load < 200 copies/mL). Factors that had a negative impact on HIV viral suppression included being male ($P=.02$), employed ($P=.04$) or prescribed a protease-based inhibitor containing regimen ($P=.03$). Marginal statistically significance was observed for years of taking ART and a history of drug use. Patients who achieved viral suppression tended to have a longer time period of taking ART than those who were not viral suppressed.

Table 1. Demographic Characteristics of the Study Participants (N = 193).

	Viral Suppression				P value
	Yes (N = 162)		No (N = 31)		
	N	%	N	%	
Demographics					
Age					.13
18-34	21	13.0	8	25.8	
35-54	97	59.9	18	58.1	
>55	44	27.2	5	16.1	
Sex					.02
Female	105	64.8	13	41.9	
Male	57	35.2	18	58.1	
Nationality					.87
Dominican	141	91.0	27	90.0	
Haitian and other	14	9.0	3	10.0	
Race					.58
Mestizo/Indio	78	55.7	18	62.1	
Black	34	21.9	4	13.8	
White	26	16.8	6	20.7	
Other	2	1.3	1	3.4	
Education					.95
0-6 years	77	48.4	13	41.9	
7-9 years	67	42.1	13	41.9	
> 10 years	15	9.4	5	16.1	
Employment					.04
Employed	114	72.2	28	90.3	
Unemployed	44	27.8	3	9.7	
Health Insurance Status					.21
No	126	78.3	21	67.7	
Yes	35	21.7	10	32.3	
Alcohol use					.14
Never	97	68.8	17	56.7	
Rarely	30	21.3	5	16.7	
1-2 times per month	9	6.4	5	16.7	
1-2 times per week	5	3.5	3	10	
Every day	1	0.7	0	0	
Drug use					.06
No	134	95.7	26	86.7	
Yes	6	4.3	4	13.3	
ART regimen-related factors					
Years on ART (median, IQR)	7 (3,10)		5 (2,10)		.38
On NNRTIs					.14
No	56	34.6	15	48.4	
Yes	106	65.4	16	51.6	
On PIs					.03
No	129	79.6	19	61.3	
Yes	33	20.4	12	38.7	
Transportation-related barriers					
Do you live close or far from the clinic?					.74
Close	76	46.9	13	43.3	
Far	80	49.4	15	50	
In between	6	3.7	2	6.7	
Is transportation cheap or expensive?					.38
Cheap	67	42.9	15	51.7	
Expensive	89	57.1	14	48.3	

(Median: 7 years vs 5 years, interquartile range (IQR):3-11 years versus 2-10 years; $P = .08$). A history of drug use was associated with viral non-suppression ($P = .06$).

Logistic regression analysis of HIV viral suppression shows that males were 155% more likely (crude odds ratio (OR): 2.55, 95% confidence interval [CI]: 1.17-5.58) to be virally non-

suppressed than females. Those who were virally non-suppressed were 72% less likely (crude OR: 0.28, 95% CI: 0.08-0.96) to be unemployed. When adjusting for male sex, employment had a marginally significant effect on viral suppression (adjusted OR: 0.32, 95% CI: 0.08-1.21). (Table 2a)

Logistic regression analysis of imperfect adherence shows that males were 22% (crude OR: 0.78, 95% CI: 0.40-1.53) and unemployed participants were 72% less likely (crude OR: 0.28, CI: 0.08-0.96) to report missing at least 1 dose of their ART. When adjusting for male sex, employment did not have a significant effect (adjusted OR: 0.79, 95% CI: 0.31-2.01). Those in older age groups were also less likely (35-54 years, crude OR: 0.27, 95% CI: 0.12-0.61; 55+ years, crude OR: 0.16, 95%CI: 0.06, 0.45) to report imperfect adherence than younger patients in the 18-34 age group. (Table 2b)

Table 2. Multivariate Analysis of Viral Suppression (2a) and Imperfect Adherence (2b).

	Viral non-suppression	
	Crude odds ratio (OR)	Adjusted OR ^a
Table 2a		
Sex		
Female	Ref	.
Male	2.55 (1.17, 5.58)	.
Age		
18-34	Ref	.
TMR35-54	0.49 (0.19, 1.27)	.
>55	0.30 (0.09, 1.02)	.
Race		
Mestizo/indio	Ref	.
Black	0.51 (0.16, 1.62)	.
White	1.00 (0.36, 2.79)	.
Other	2.17 (0.14, 0.39)	.
Employment		
Employed	Ref	Ref
Unemployed	0.28 (0.08, 0.96)	0.32 (0.08, 1.21) ^a
Table 2b		
	Imperfect adherence Crude odds ratio (OR)	Adjusted OR ^a
Sex		
Female	Ref	.
Male	0.78 (0.40, 1.53)	.
Age		
18-34	Ref	.
35-54	0.27 (0.12, 0.61)	.
>55	0.16 (0.06, 0.45)	.
Race		
Mestizo/indio	Ref	.
Black	1.30 (0.56, 3.00)	.
White	0.59 (0.20, 1.70)	.
Other	1.10 (0.11, 11.1)	.
Employment		
Employed	Ref	Ref
Unemployed	0.75 (0.34, 1.64)	0.79 (0.31, 2.01) ^a

^aORs adjusted for age, race, and sex.

Self-Reported Treatment Adherence

PWH who achieved viral suppression were statistically more likely to rank their adherence positively as compared to those who had not. Among those who reported never missing a single dose in the past 30 days, most were virally suppressed, but 14.7% were not. (Table 3)

On average, participants who missed fewer HIV appointments were more likely to be virally suppressed ($P=.001$). After adjusting for employment, those with missed appointments were still less likely to have HIV viral suppression (adjusted OR: 2.28, 95% CI:1.40-3.72).

Perceived Barriers and Facilitators

The structured interview questionnaire also provided insight into the most common barriers and facilitators that participants reported were relevant to their ability to adhere to their HIV care and ART.

Table 3. Outcomes from Self-Reported Treatment Adherence Tool.

	Viral Suppression				P value
	Yes (N=162)		No (N=31)		
	N	%	N	%	
<i>How many doses of your HIV medications did you miss in the last 30 days?</i>					.03
Never missed a single dose	129	79.6	19	61.3	
Missed at least a single dose	33	20.4	12	38.7	
<i>In the last 30 days, how good of a job did you do of taking your HIV medications in the way that you are supposed to?</i>					<.001
Very bad	0	0.0	2	6.5	
Bad	1	0.6	3	9.7	
Regular	4	2.5	2	6.5	
Good	32	19.8	8	25.8	
Very good	36	22.2	3	9.7	
Excellent	89	54.9	13	41.9	
<i>In the last 30 days, how frequently did you take your HIV medications in the way that you are supposed to?</i>					.002
Never	0	0.0	1	3.2	
Rarely	1	0.6	2	6.5	
Sometimes	0	0.0	1	3.2	
Usually	12	7.4	4	12.9	
Almost always	37	22.8	3	9.7	
Always	112	69.1	20	64.5	
<i>In the last year, how many appointments for your HIV consultation have you missed?</i>					.001
0	139	85.8	19	61.3	
1	18	11.1	5	16.1	
2	3	1.9	4	12.9	
3	1	0.6	2	6.5	
4	1	0.6	1	3.2	

Table 4. Reported Barriers and Facilitators to HIV Care.

	Frequency (N)
<i>Barriers</i>	
I was worried about my privacy.	111
I didn't have money for transportation.	85
I felt ashamed or embarrassed.	77
I was depressed or anxious.	74
I was afraid that my family would find out about my HIV status.	74
There were problems with transportation (strikes, protests).	49
The appointment was inconvenient for me.	48
I was worried that the medications would affect other parts of my body.	43
I didn't want to think about being HIV positive (I was in denial).	36
I didn't have sufficient information about HIV.	31
The side effects of the medication made me feel worse.	30
<i>Facilitators</i>	
I felt worse and decided I needed to take care of my health.	171
I wanted to be able to take care of my children.	119
I realized it was important to continue taking my medication to maintain my CD4 count and viral load.	118
My doctor reminded me to take my medication.	117
I realized it was important to see a healthcare provider.	106
I accepted my HIV diagnosis.	100
I felt less worried for my privacy.	100
I wanted to live and/or was afraid to die.	97
I was able to get money for transportation.	86
The appointment was more convenient.	73

Table 4 shows the top 10 barriers and facilitators reported by the 202 participants that participated in this survey. The most common barriers were related to lack of confidentiality concerns, structural barriers and stigma. The most prevalent barrier reported was concern for privacy (n = 111), but feelings of shame and embarrassment (n = 77) and feeling afraid that their family would find out their HIV status (n = 74) were common stigma- and confidentiality-related barriers. Many patients also expressed feeling anxious or depressed (n = 74). Challenges associated with transportation to the clinic were also relatively common, such as lacking money for transportation (n = 85), not being able to get to the clinic due to strikes within the transportation system (n = 45) or that their appointments were inconvenient (n = 48).

When asked which factors helped them remain engaged in care, participants most often reported that it was important for them to take care of their health so that they would not feel worse (n = 171), to be able to take care of their children (n = 119), or to maintain their CD4 count and viral load (n = 118). Acceptance of their diagnosis (n = 100) and less concern with issues relating to privacy (n = 100) were also reported to have a positive impact. Finally, a significant proportion of participants

indicated the following facilitators: acknowledgement of the importance of seeing a health care provider (n = 106), ability to get money for transportation (n = 86) and more convenient appointment scheduling (n = 73). (Table 4)

Discussion

In this study, we conducted a self-reported adherence assessment, a survey of barriers and facilitators, and a chart review in order to evaluate factors associated with viral suppression among adults living with HIV engaged in care at CEDI in Santiago, DR. Of patients enrolled in this study, 83.9% had a viral load less than 200 copies/mL. Patients that were not virally suppressed were significantly more likely to be male, taking second-line regimens such as protease inhibitors, miss follow-up appointments or be currently employed. These findings may help to tailor interventions for PWH who may benefit from additional support to remain engaged in care.

The global standard of HIV care is universal access to ART, which has significantly increased life expectancy and decreased mortality and morbidity caused by HIV.^{12,13} The Treatment as Prevention (TasP) model, which now informs HIV prevention strategies worldwide, suggests that achieving high rates of viral suppression by scaling up access and adherence to ART among PWH may significantly reduce future transmission, since undetectable means untransmissible (U=U).¹⁴ The potential success of the TasP framework relies on individual patients achieving and sustaining viral suppression through adequate adherence to ART and consistent engagement in HIV care.¹⁵ However, achieving stable compliance to ART regimens within the cascade of HIV care remains a significant challenge, particularly in resource-limited settings.¹⁶

We found that there are multifactorial barriers and facilitators that influence patient's engagement in care, even if they are virally suppressed and report excellent adherence. Social factors including stigma, lack of social support and confidentiality concerns as well as structural factors relating to transportation and more convenient appointments.

Our finding that male patients are less likely to be virally suppressed is consistent with other studies that have shown that male patients have decreased engagement in HIV care in the DR and the greater Caribbean region.^{17,18} In this study, male patients constitute only 38.8% of this study population, but they represent close to half of the total number of PWH in the DR and 47.2% of all patients at CEDI. Male patients might encounter additional barriers to accessing care, which may not be fully represented here given that our sample population consisted of patients who were in the clinic for an appointment or to pick up medications from the pharmacy and that were willing to participate.

This study showed that employed PWH were less likely to have an undetectable viral load. This may be related to fear of discrimination and/or stigma from their employer as well as having limited time off to attend appointments. In qualitative studies of PWH in the DR, many participants described experiences of stigma and discrimination in employment settings due

to their HIV status, including job loss, illegal HIV testing by employers and other stigma-related barriers.^{19,20} Additionally, many patients in this study reported that transportation to the clinic was a major barrier due to cost and logistical complications. This effect may be even greater since we used a convenience sample of those patients who were already at the clinic, so we could not assess those patients for whom transportation was preventing them from accessing care in the first place. An evaluation of an adherence intervention in La Romana, DR revealed that transportation and work schedule conflicts are important factors in achieving persistent adherence, and future studies should explore the association between transportation barriers and loss to follow-up in order to capture those who are most at risk for poor adherence.²¹ In contrast, some studies have shown employment to be a protective factor for viral suppression, suggesting a complex relationship between employment status, stigma and clinical outcomes.¹⁷

We identified that PWH prescribed PI-based regimens were less likely to achieve HIV viral suppression which has not been previously reported in the literature from the DR. Patients who are on second-line regimens are more likely to be at risk for virologic failure due to existing difficulties with ART adherence and possibly undiagnosed drug resistance.^{22–24} Other contributing factors include the greater pill burden, more complicated dosing schedules, and higher rates of adverse effects known to be associated with PI-based regimens.^{25,26} Access to genotype testing is limited for PWH in the DR, and ART regimens are frequently changed based on HIV disease progression, lack of viral suppression and the availability of medications in the hospital pharmacy. The rate of virologic failure to certain ART regimens due to drug resistance is unknown, though one small study detected at least one antiretroviral class mutation in 54% of samples from the DR, with 24% of patients having multi-class resistance.²³

The DR Ministry of Health has updated the national HIV treatment guidelines, and in 2019 Dolutegravir was included and made available as a first-line agent in combination with a dual nucleoside reverse transcriptase inhibitor (NRTI) backbone. This once-daily combination regimen has been shown to have improved efficacy, tolerability and is particularly important given that some low- and middle-income countries report a pretreatment drug resistance to Efavirenz of over 10%.²⁷ Other treatment regimens that are being evaluated for low-income countries to improve adherence and tolerability, and limit pill burden include long-acting injectable cabotegravir-rilpivirine which has shown on modeling studies to be cost-effective in PWH with an HIV VL of more than 1000 copies/mL but there is concern for potentially inducing integrase inhibitor resistance.^{24,28}

This paper complements the literature to help characterize common barriers to HIV care among people living with HIV in the DR and the greater Caribbean region. Risk factors for non-adherence to ART found in other urban regions of the DR (Santo Domingo and Puerto Plata) included heavy alcohol use, having children and perceptions of less social support.²⁹ Previous research has also found that stigma and

fear are common barriers to people seeking HIV care in the DR, and that certain populations may be more affected as a product of the reinforcement of existing prejudices in the Dominican society, especially anti-Haitianism and gender inequality.^{18,30,31} In addition, ongoing socioeconomic challenges related to the high levels of poverty in the DR are significant barriers to access to HIV care.^{29,31}

Individuals of Haitian descent who are living with HIV in the DR may be at risk for worse outcomes due to both HIV-related stigma and the generalized discrimination they face in Dominican society.²⁵ According to the 2020 PEPFAR report, the HIV prevalence in this group ranges between 3–5% which is even higher than the reported HIV prevalence of 2% in Haiti, per UNAIDS in 2018.³² Haitian patients constituted about 10% of our study population and had a slightly higher (though not statistically significant) rate of having a detectable viral load.²⁴ Among those that reported being Dominican we did not assess if they were of Haitian descent. Additional research and interventions are needed to better address the structural racism that persons of Haitian descent face and its impact on their HIV care. Other ‘key populations’ within the DR include those living in rural Bateye communities, gender and sexual minorities (men who have sex with men and transgender individuals), and individuals involved in sex work.^{18,29,33–35}

In this study, only HIV patients who were visiting for their clinic appointment or to pick up their medications were able to be assessed, so they may not be fully representative of the population of PWH in the DR. However, this “real world” sample provides a snapshot of those who are accessing care at a public hospital.

There is a need for alternative methods of assessing HIV viral suppression in settings with limited laboratory resources. We analyzed whether a validated tool could correlate with HIV viral suppression. While the results reported here show an association between levels of optimal self-reported adherence and viral suppression, the adherence tool missed some cases of an unsuppressed viral load when participants reported high levels of “Excellent” adherence or “Always” taking their medications as prescribed. However, patients who report anything except “Excellent/Very Good” or “Always/Almost Always” were much more likely to have a detectable viral load (VL > 200 copies/mL).

Of the questions asked in the adherence assessment, endorsing having missed appointments, had the strongest association with not being virally suppressed. Those who had missed appointments recently were less likely to be virally suppressed ($P = .0001$). This is consistent with other studies showing that keeping scheduled clinic appointments correlates with clinical indicators of HIV outcomes.²¹

A short adherence assessment may be a helpful tool to prompt an adherence discussion with peer navigators, closer follow up with a clinician, or other relevant interventions. However, social desirability bias may play an important role in responses to the self-reported sections of this survey, and this tool likely overestimated patients’ actual adherence. While neither self-reported adherence nor viral load are

perfect indicators of patient's true adherence, using both can provide insight into patient's response to their ART regimens.^{36,37}

Conclusions

With the initiative to adopt Treatment as Prevention models to end the HIV epidemic around the world, identifying and addressing challenges related to adherence and viral suppression are crucial to both individual patient outcomes and the future of the HIV epidemic on a larger scale. Future studies in the DR ought to investigate how to better support those who may be at highest risk for HIV virologic failure due to difficulties with retention in care, ART adherence and acquired ART resistance to develop effective interventions.

Acknowledgement

This research was supported in part by NIH/NIAID R25AI140490. We would like to acknowledge Rachael Diaz and Brittnie Miles for their contributions to conduct this research.


Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Martha C Sanchez  <https://orcid.org/0000-0002-1634-4591>

References

1. Global HIV/AIDS Overview. HIV.gov. 2021.
2. Rojas P, Malow R, Ruffin B, Rothe EM, Rosenberg R. The HIV/AIDS epidemic in the Dominican Republic. *J Int Assoc Physicians AIDS Care*. 2011;10(5):306–315. doi:10.1177/1545109710397770
3. UNAIDS. Miles to go - The response to HIV in the Caribbean. 2018;46. https://www.unaids.org/en/resources/documents/2018/miles-to-go_caribbean
4. UNAIDS. Dominican Republic Fact Sheet. UNAIDS. 2021. <https://www.unaids.org/en/regionscountries/countries/dominicanrepublic>
5. UNAIDS. Global AIDS Strategy 2021–2026 — End Inequalities. End AIDS. 2021;164. <https://www.unaids.org/en/resources/documents/2021/2021-2026-global-AIDS-strategy>
6. HIV TCDoG. Dominican Republic Country Profile. 2019. <https://www.cdc.gov/globalhivtb/where-we-work/DominicanRepublic.pdf>
7. Sida CNPEVIHyE. Gobierno invertirá 16 millones de dólares en tratamiento antirretroviral. 2021.
8. Norma para la prevención y atención de las infecciones de transmisión sexual (ITS), del virus de inmunodeficiencia humana (VIH) y de las hepatitis en la República Dominicana. 2021;64. <https://repositorio.msp.gob.do/handle/123456789/2257>
9. Phillips T, Brittain K, Mellins CA, et al. A self-reported adherence measure to screen for elevated HIV viral load in pregnant and postpartum women on antiretroviral therapy. *AIDS Behav*. 2017;21(2):450–461.
10. Wilson IB, Fowler FJ, Cosenza CA, et al. Cognitive and field testing of a new set of medication adherence self-report items for HIV care. *AIDS Behav*. 2014;18(12):2349–2358.
11. Wilson IB, Lee Y, Michaud J, Fowler FJ, Rogers WH. Validation of a new three-item self-report measure for medication adherence. *AIDS Behav*. 2016;20(11):2700–2708.
12. Palella FJ, Delaney KM, Moorman AC, et al. Declining morbidity and mortality among patients with advanced human immunodeficiency virus infection. *N Engl J Med*. 1998;338(13):853–860. doi:10.1056/nejm199803263381301
13. Smiley CL, Rebeiro PF, Cesar C, et al. Estimated life expectancy gains with antiretroviral therapy among adults with HIV in Latin America and the Caribbean: a multisite retrospective cohort study. *The Lancet HIV*. 2021;8(5):e266–e273. doi:10.1016/s2352-3018(20)30358-1
14. Cohen MS, Chen YQ, McCauley M, et al. Prevention of HIV-1 infection with early antiretroviral therapy. *N Engl J Med*. 2011;365(6):493–505.
15. Cohen J. *Halting hiv/Aids Epidemics*. American Association for the Advancement of Science; 2011.
16. Geng EH, Nash D, Kambugu A, et al. Retention in care among HIV-infected patients in resource-limited settings: emerging insights and new directions. *Curr HIV/AIDS Rep*. 2010;7(4):234–244.
17. Edwards RJ, Cyrus E, Bhatt C, Lyons N, Lavia L-O, Boyce G. Viral suppression among persons living with HIV in Trinidad & Tobago: implications for targeted prevention programmes. *Glob Public Health*. 2019;14(11):1569–1577. doi:10.1080/17441692.2019.1633379
18. Hamilton A, Shin S, Taggart T, et al. HIV Testing barriers and intervention strategies among men, transgender women, female sex workers and incarcerated persons in the Caribbean: a systematic review. *Sex Transm Infect*. 2020;96(3):189–196. doi:10.1136/sextrans-2018-053932
19. Barrington C, Acevedo R, Donastorg Y, Perez M, Kerrigan D. 'HIV and work don't go together': employment as a social determinant of HIV outcomes among men who have sex with men and transgender women in the Dominican republic. *Glob Public Health*. 2017;12(12):1506–1521. doi:10.1080/17441692.2016.1160141
20. Barrington C, Kerrigan D, Ureña FIC, Brudney K. La vida normal: living with HIV in Santo Domingo, Dominican republic. *Cult Health Sex*. 2018;20(1):40–54. doi:10.1080/13691058.2017.1323350
21. Winter MC, Halpern M, Brozovich A, Neu N. Evaluation of an HIV adherence counseling program in La Romana, Dominican Republic. *Journal of the International Association of Providers of AIDS Care (JIAPAC)*. 2014;13(4):361–365.
22. Ramadhani HO, Bartlett JA, Thielman NM, et al. *Association of First-Line and Second-Line Antiretroviral Therapy Adherence*. Oxford University Press; 2014:ofu079.
23. Grant-Mcauley W, Fogel JM, Galai N, et al. Antiretroviral drug use and HIV drug resistance in female sex workers in Tanzania and the Dominican Republic. *PLOS ONE*. 2020;15(10):e0240890. doi:10.1371/journal.pone.0240890

24. Bouzidi K E, Datir RP, Kwaghe V, et al. Deep sequencing of HIV-1 reveals extensive subtype variation and drug resistance after failure of first-line antiretroviral regimens in Nigeria. *J Antimicrob Chemother.* 2021. doi:10.1093/jac/dkab385
25. AJose O, Mookerjee S, Mills EJ, Boulle A, Ford N. Treatment outcomes of patients on second-line antiretroviral therapy in resource-limited settings: a systematic review and meta-analysis. *Aids.* 2012;26(8):929–938.
26. Duran S, Spire B, Raffi F, et al. Self-reported symptoms after initiation of a protease inhibitor in HIV-infected patients and their impact on adherence to HAART. *HIV Clin Trials.* 2001;2(1):38–45.
27. World Health Organization (WHO). Consolidated guidelines on HIV prevention, testing, treatment, service delivery and monitoring: recommendations for a public health approach. 16 July 2021;2021:594.
28. Phillips AN, Bansi-Matharu L, Cambiano V, et al. The potential role of long-acting injectable cabotegravir–rilpivirine in the treatment of HIV in sub-Saharan Africa: a modelling analysis. *The Lancet Global Health.* 2021;9(5):e620–e627. doi:10.1016/s2214-109x(21)00025-5
29. Harris J, Pillinger M, Fromstein D, et al. Risk factors for medication non-adherence in an HIV infected population in the Dominican republic. *AIDS Behav.* 2011;15(7):1410–1415.
30. Yam EA, Pulerwitz J, Almonte D, et al. Stigma among key populations living with HIV in the Dominican Republic: experiences of people of Haitian descent, MSM, and female sex workers. *AIDS.* 2020;34:S43–S51. doi:10.1097/qad.0000000000002642
31. Arregui M. Living with HIV in the Dominican Republic. *Revista Interamericana de Psicología/Interamerican Journal of Psychology.* 2007;41(1):31–40.
32. *Dominican Republic Country Operational Plan Strategic Direction Summary.* 2020;57. 1 April 2020.
33. Figueroa JP. Review of HIV in the Caribbean: significant progress and outstanding challenges. *Curr HIV/AIDS Rep.* 2014;11(2):158–167.
34. Halperin DT, de Moya EA, Pérez-Then E, Pappas G, Calleja JMG. Understanding the HIV epidemic in the Dominican republic: a prevention success story in the Caribbean? *JAIDS J Acquir Immune Defic Syndr.* 2009;51:S52–S59.
35. Felker-Kantor E, Polanco C, Perez M, et al. “Todo se trata de a quién conoces”: social networks and drug use among female sex workers living with HIV in the Dominican republic. *AIDS Behav.* 2021;25(4):1276–1289. 2021/04/01. doi:10.1007/s10461-020-03094-8.
36. Nachega JB, Hislop M, Dowdy DW, Chaisson RE, Regensberg L, Maartens G. Adherence to nonnucleoside reverse transcriptase inhibitor–based HIV therapy and virologic outcomes. *Ann Intern Med.* 2007;146(8):564–573.
37. Gross R, Yip B, Re VLIII, et al. A simple, dynamic measure of antiretroviral therapy adherence predicts failure to maintain HIV-1 suppression. *J Infect Dis.* 2006;194(8):1108–1114.