

Preference for long-acting injectable for ART and PrEP among people with and without HIV: a cross-sectional study in Argentina

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Abstract

Background: Little is known about the preferences for antiretroviral therapy (ART) administration methods, such as oral daily pills or long-acting injectable (LAI) options, as well as preferences for pre-exposure prophylaxis (PrEP) administration methods among people without HIV in Latin America.

Objectives: This study aimed to assess the preferences for ART administration methods among people with HIV and PrEP methods among those without HIV, as well as to examine the correlations and reasons for these preferences.

Design: We conducted a cross-sectional web-based questionnaire between April and July 2021, using social media accounts of a HIV non-governmental organization. The questionnaire was open to all adults living in Argentina, irrespective of their sexual orientation or gender identity.

Methods: The questionnaire included questions on substance use, depression, chronic treatment, previous experiences with injectable medication, and HIV status. Those with HIV answered questions about ART adherence and their preferences for ART methods, while those without HIV were asked about condom use, awareness of PrEP, and their preferences for PrEP methods.

Results: Out of 1676 respondents, 804 had HIV, and 872 did not. Among those with HIV, 91.5% expressed a high preference for LAI-ART, with significantly higher preferences among participants with higher educational levels, cisgender gay, bisexual, and queer men, younger individuals, and those with prior injectable medication experience. Among those without HIV, 68% preferred LAI-PrEP, and this preference was positively associated with previous positive experiences with injectable medication.

Conclusion: The strong preference for LAI-ART suggests the potential for improved adherence and well-being among people with HIV. Additionally, the preference for LAI-PrEP among those without HIV emphasizes the importance of considering this option for HIV prevention strategies. This study highlights the need to offer diverse methods for ART and prevention to accommodate different preferences and improve health care outcomes in Latin America.

Keywords: antiretroviral therapy, Latin America, long-acting injectable, patient preference, pre-exposure, prophylaxis

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Introduction

HIV has had a significant impact on Latin America, where it is estimated that more than 2 million people have contracted the virus.¹ In

this region, the HIV epidemic disproportionately affects cisgender men who have sex with men (MSM), transgender women, and sex workers. Yet, despite extensive efforts to combat the

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epidemic, challenges persist due to a confluence of factors, including poverty, stigma and discrimination, lack of quality health care, inequities in access to antiretroviral therapy (ART), and the added strain of the COVID-19 pandemic.² In Argentina, where an estimated 140,000 people are living with HIV, the prevalence among transgender women is approximately 34%, among MSM it ranges from 12% to 15%, and among sex workers it ranges from 2% to 5%. As new cases continue to be identified, a broad spectrum of cisgender women and transgender people is affected. The distribution of new HIV diagnoses by gender between 2019 and 2021 was as follows: 60.4% for cisgender men, 29.3% for cisgender women, and 1.2% among transgender people.³

Long-acting medications, such as contraceptives, have been delivered effectively and widely by injectable methods for over 50 years. Long-acting injectable (LAI) are well-known for their ability to promote adherence, maintain consistent medication levels in the bloodstream, and reduce the dosing frequency.⁴ Moreover, in the last decade, there have been significant advances in the HIV field, with studies involving LAI options for antiretroviral administration, proving their safety and effectiveness in HIV management, both for therapy and prevention.⁵⁻⁷

LAI-based ART (LAI-ART) is viewed mainly positively by communities, donors, and policymakers as a means of tackling stigma and poor adherence.⁸⁻¹⁰ Among people living with HIV, LAI-ART has garnered acceptance, offering a possible liberation from concerns about missed doses, pill fatigue, and disclosure. Notably, people with higher education, younger age, and who identify as MSM, have shown a greater inclination toward LAI-ART.^{8,9,11,12} This newfound enthusiasm is echoed in Argentina. In a recent questionnaire, 83.5% of patients at a healthcare center in Buenos Aires have expressed willingness to transition from oral ART to monthly LAI-ART if provided the option. Feedback from participants in clinical trials conducted in the country underscores the convenience and discretion offered by LAI-ART. These aspects alleviate the daily reminder of one's HIV status and the risk of unintended disclosure, emerging as key factors influencing the choice of this method.^{6,13}

Beyond the scope of treatment, antiretrovirals have also emerged as a potent tool for

pre-exposure prophylaxis (PrEP) against HIV infection for the most affected groups. Long-acting PrEP (LAI-PrEP), administered *via* injection, has exhibited safety, efficacy, and superiority over oral daily PrEP in clinical trials.¹⁴⁻¹⁹ In studies conducted in Brazil and Peru, LAI-PrEP would be the most chosen option, while in Mexico, it ranked second compared to oral PrEP.²⁰ In another qualitative study in Brazil, high interest in LAI-PrEP was demonstrated, linked to the elimination of barriers such as pill burden and greater autonomy in the healthcare system.¹⁸ Barriers were mentioned to a lesser extent compared to advantages and included issues related to fear of needles, lack of knowledge about effectiveness, and side effects.¹⁸

As Argentina struggles with restricted access to oral PrEP and limited awareness of LAI-PrEP, a recent implementation study of oral PrEP revealed an initiation rate of 52% among eligible individuals from the key population. This rate aligns with the acceptability reported in other countries within the region.¹³ In this context, gaining a comprehensive understanding of preferences becomes crucial. Preferences are influenced by the intricate interplay of various psychosocial factors, including but not limited to convenience, confidentiality, and health-related concerns.¹³

Given these considerations, the goal of this study is threefold: first, to assess the preference of ART administration methods among people with HIV and PrEP methods among those without HIV; second, to examine the correlations with demographic and psychosocial factors; and third, to describe the motives driving method preferences.

Methods

Study design

A cross-sectional web-based questionnaire was conducted using SurveyMonkey.com[®] (SurveyMonkey Inc., San Mateo, CA, USA) between April and July 2021.

Setting and sample

Participants were recruited through the social media platforms of a non-governmental organization (NGO) dedicated to HIV and sexual and reproductive health. The extensive reach and engagement of this NGO's social media accounts

facilitated the inclusion of a wide range of people from diverse backgrounds and regions across Argentina.

Participants were required to meet two primary criteria: (1) age of 18 years or older, and (2) current residency in Argentina. The participants that did not meet the criteria, were disqualified and not permitted to complete the remainder of the questionnaire. Regarding the missing values, incomplete questionnaires were discarded (respondents with >90% of unanswered questions).

Data collection

Instrument. The questionnaire items were developed drawing from the factors associated with ART and PrEP method preferences found in existing literature aiming to design a questionnaire that was both comprehensive and short for online administration. Additionally, a multidisciplinary research team, consisting of a pharmacist, a physician, a psychologist, and community members who worked as peer navigators within the NGO, contributed by proposing subjects and questions they considered pertinent to the topic. Moreover, the peer navigators tested the final web-based questionnaire to ensure its clarity and cultural appropriateness.

The final questionnaire included the following variables (Table 1): socio-demographic questions, sexual orientation and gender identity, substance use, depression symptoms, presence of chronic treatment, previous use of injectable medication, perception of experience with injectable medication, and HIV status.

In addition, following the inquiry regarding awareness of PrEP, the questionnaire incorporated a concise explanation about PrEP to provide participants with the necessary information to make informed responses about their preferences for methods of administration. The questionnaire included predefined options for preference reasons, along with an open-ended 'other' option for providing additional details or reasons.

Data analysis

The data was analyzed for two distinct groups: people with HIV and their preferences regarding LAI-ART or pills, and for people without HIV

and their preferences for LAI-PrEP or pills. Sexual orientation and gender identity responses were grouped to simplify the analysis and to facilitate the interpretation of the results. The following groups were formed: cisgender gay, bisexual, and queer men; cisgender heterosexual men; cisgender lesbian, bisexual, and queer women; cisgender heterosexual women; and transgender and non-binary people. Frequencies and percentages were calculated for categorical variables, and medians and interquartile ranges (IQRs), for continuous variables.

Statistical analyses were performed using Statistical Package for the Social Sciences v29.0 (IBM Corporation, Armonk, New York, USA).²¹ Given that data was not normally distributed, the Mann-Whitney *U* test was used for comparisons between groups. To explore variables associated with preference of LAI *versus* pills, Chi-square tests were conducted, calculating the odds ratios (ORs) and their confidence intervals (CIs). Variables with expected frequency in each cell not less than 5, Fisher's test was used. The influence of confounding factors on the analysis was corrected by evaluating the OR in the unadjusted and adjusted setups. The OR values in unadjusted and adjusted setups assessed the influence of multiple confounders or one specific confounder on the outcome of LAI preference. The significance level was set at 5%. Significant parameters in bivariate analyses were included in the multivariable analysis (logistic regression).

Results

Sociodemographic characteristics

Of a total of 1940 who opened the questionnaire's link, 6 (0.3%) did not accept the informed consent, 34 (1.7%) reported being younger than 18 years of age, and 81 (4.2%) did not live in Argentina, resulting in 1819 eligible participants. In total, 1676 (92.1%) of those who started the questionnaire completed it and were included in this analysis as the final sample size.

Sociodemographic characteristics are presented in Table 2. Participants were young (median = 33 years, IQR = 28–41), 40.1% self-identified as cisgender heterosexual women, 6.8% as cisgender lesbian, bisexual, or queer women, 5.1% as cisgender heterosexual men, 42.8% as cisgender gay, bisexual, and queer men, and 5.2% as

Table 1. Variables and questions.

Topics	Question
Sociodemographic characteristics	Are you over 18 years old? (Yes/No) Age (Numerical discrete variable) Gender: (a) Woman, (b) Man, (c) Trans woman, (d) Trans man, (e) Non-binary, (f) Other (specify) What is your country of birth? (a) Argentina, (b) Bordering country (Uruguay, Brazil, Chile, Paraguay, or Bolivia), (c) Other South American country, (d) Other Central American country, (e) Other North American country (USA, Canada, or Mexico), (f) Other European country, (g) Other African country, (h) Other Asian country, (i) Don't know/prefer not to say Where do you live? (a) Argentina, (b) Bordering country (Uruguay, Brazil, Chile, Paraguay, or Bolivia), (c) Other South American country, (d) Other Central American country, (e) Other North American country (USA, Canada, or Mexico), (f) Other European country, (g) Other African country, (h) Other Asian country, (i) Don't know/prefer not to say What is your current place of residence? (a) City of Buenos Aires, (b) Greater Buenos Aires, (c) Buenos Aires Province, (d) Other provinces, (e) Don't know/prefer not to say What is the highest educational level you attended or completed? (a) Incomplete primary school, (b) Complete primary school, (c) Incomplete secondary school, (d) Complete secondary school, (e) Incomplete University, (f) Complete University, (g) Don't know/prefer not to say Sexual orientation: (a) Heterosexual, (b) Homosexual, (c) Bisexual, (d) Pansexual, (e) Other (specify)
Substance use	Do you use substances such as alcohol, marijuana, cocaine, etc.? (Yes/No)
Depression symptoms	Are you experiencing symptoms that you associate with depression? (Yes/No)
Chronic treatment	Do you take medication every day? For example, for blood pressure (Yes/No)
Previous use of injectable medication	Have you ever had an injectable? For example, analgesics, corticosteroids, vaccines. (Yes/No) How was that experience? (Good/Bad/Indifferent)
For people with HIV	
HIV status	Are you living with HIV? (Yes/No)
ART therapy	Are you taking HIV treatment? (Yes/No) How many pills for HIV do you take per day? (1, 2, 3, 4, 5, or more)
Preference of LAI-ART versus pills	If there was a possibility of receiving your ART in intramuscular injectable form every 2 or every 6 months, what would you choose? (a) Continue with pills, (b) Injectable every 2 months, (c) Injectable every 6 months)
Preference for delivery setting	From whom and where would you like to receive the injectable ART? (a) Doctor's office, (b) nurse office, (c) pharmacy, (d) domiciliary by a healthcare professional or (e) by themselves
Reasons for choosing pills	Why do you choose the pill option and NOT the injectable option? (a) For the convenience of pills, (b) Safety and efficacy of the pills, (c) The injections cause me discomfort, inconvenience, and pain, (d) I don't believe in injections and they don't seem safe to me, (e) I have had a previous experience with injections and it was unpleasant, (f) I am afraid of them, (g) I don't like needles or anything that pokes, (h) Other (specify)
Reasons for choosing LAI-ART	Why do you choose the injectable option and NOT the pill option? (a) Discretion and privacy by not having to carry pills with me, (b) To forget about the infection for a moment if I don't have to take pills every day, (c) It bothers me to remember to take pills, (d) I think it would improve my quality of life, (e) Because of the discomfort of having to take pills every day, (f) I feel that the pills are not safe or effective, (g) I don't mind taking injections, (h) I believe in injections are a better way to give medicine than a pill, (i) Injections seem safe to me, (j) I have had a previous experience with injections and did not feel pain or discomfort, (k) I had a bad experience taking pills (they are hard to swallow, taste bad, make my stomach hurt, make me nauseous, make me feel sick), (l) Other (specify)

(Continued)

Table 1. (Continued)

Topics	Question
For people without HIV	
Use of condom	How often do you use protection against HIV/STIs (condom or dental dam) with your sexual partners? (Always, almost always, Sometimes, Never)
Awareness of PrEP	Have you heard of PrEP? (Yes/No)
Preference of LAI-PrEP versus pills	If you could choose an HIV prevention medicine (PrEP) which form of administration would you prefer? (a) 1 pill every day, (b) 1 pill once a week, (c) 1 injectable every 2 months, (d) 1 injectable every 6 months, reasons for this preference and delivery setting preference.
Preference for delivery setting	From whom and where would you like to receive the injectable ART? (a) Doctor's office, (b) nurse office, (c) pharmacy, (d) domiciliary by a healthcare professional or (e) by themselves
Reasons for choosing pills	Why do you choose the pill option and NOT the injectable option? (a) For the convenience of pills, (b) Safety and efficacy of the pills, (c) The injections cause me discomfort, inconvenience, and pain, (d) I don't believe in injections and they don't seem safe to me, (e) I have had a previous experience with injections and it was unpleasant, (f) I am afraid of them, (g) I don't like needles or anything that pokes, (h) Other (specify)
Reasons for choosing LAI-PrEP	Why do you choose the injectable option and NOT the pill option? (a) I had a bad experience taking pills (they are hard to swallow, taste bad, make my stomach hurt, make me nauseous, etc.), (b) I think that the unwanted effects of the pills are greater than the pain of taking an injection, (c) I don't want to take a pill every day, (d) I am afraid of forgetting to take it, (e) I believe in injections are a better way to give a medication than a pill, (f) Injections seem safe to me, (g) I have had a previous experience with injections and did not feel pain or discomfort, (h) Convenience, (i) Discretion and privacy, (j) Other (specify)
ART, antiretroviral therapy; LAI, long acting injectable; PrEP, pre-exposure prophylaxis; STI, sexually transmitted infection.	

transgender or non-binary people. Almost all respondents (94.2%) completed secondary school, 94% were born in Argentina, 54.8% lived in AMBA (Area Metropolitana de Buenos Aires/Metropolitan Area of Buenos Aires) and 98.2% received injectable medication before. Nearly half of the sample (48%) were people with HIV and 52% were people without HIV or unknown status.

Preference for LAI-ART among people with HIV

As is shown in Table 3, a total of 804 people with HIV completed the questionnaire with a median age of 35 years (IQR: 30–43). Most of them were cisgender gay, bisexual, or queer men (62.4%), 98% were receiving ART of which 58% reported taking an ART consisting of two or more pills per day. Regarding the preference for ART modality, almost all people with HIV (91.5%) preferred LAI-ART (13.4% of them injectable every 2 months and 78.1% every 6 months) and 4.1% to continue with pills. Preference of LAI-ART was high in all gender/sexual orientation groups: 94.8% cisgender gay, bisexual, or queer men,

87% cisgender heterosexual women, 85.1% transgender and non-binary people, 84.6% cisgender heterosexual men, and 84.2% cisgender lesbian, bisexual, and queer women.

Multivariable analysis of predictors and correlates of LAI-ART preference

Logistic regression analyses were conducted to identify predictors of LAI-ART preference. The model is shown in Table 4. Goodness-of-fit tests were used to evaluate the suitability of the logistic regression model. Score and omnibus test values were statistically significant ($p < 0.05$). The model showed adequate goodness of fit according to the Hosmer and Lemeshow statistical value ($p > 0.001$), meaning that the model conforms to the goodness-of-fit criteria. The Nagelkerke R^2 value showed that 10% of the total variance of the model was explained.

The regression coefficient β and Wald statistics were evaluated in the logistic regression analysis. Accordingly, LAI-ART preference was found to

Table 2. Characteristics of the total sample ($n=1676$).

Variable	N (%)
Age, median (IQR)	33 (28–41)
Gender + sexual orientation	
Cis Het women	672 (40.1)
Cis LBQ women	114 (6.8)
Cis Het men	85 (5.1)
Cis GBQ man	717 (42.8)
Transgender and non-binary	88 (5.2)
Nationality	
Argentina	1575 (94.0)
Other	101 (6.0)
Education level	
High school or higher	1579 (94.2)
Up to incomplete secondary	90 (5.4)
Place of residence	
AMBA	916 (54.8)
Provinces	755 (45.2)
Use substances	
Yes	351 (20.9)
No	1325 (79.1)
Symptoms of depression	
Yes	536 (32.0)
No	1140 (68.0)
Chronic treatment	
Yes	709 (42.3)
No	967 (57.7)
Received injectable medication	
Yes	1645 (98.2)
No	31 (1.8)
Injection experience	
Good	1225 (75.0)

(Continued)

Table 2. (Continued)

Variable	N (%)
Bad	69 (4.2)
Indifferent	340 (20.8)
HIV diagnosis	
Yes	804 (48.0)
No	872 (52.0)
AMBA, Area Metropolitana de Buenos Aires-Metropolitan area of Buenos Aires; GBQ, gay, bisexual, and queer; IQR, interquartile range; LBQ, lesbian, bisexual, and queer.	

be significantly high and more common among those who reported higher educational level (adjusted Odds Ratio [aOR] = 2.691, $p=0.006$), those who identify as cisgender gay, bisexual, and queer men (aOR = 2.015, $p=0.025$), younger individuals (aOR = 0.969, $p=0.015$), and those who have received injectable medication (aOR = 0.261, $p=0.039$).

The most common reasons to choose injectable (Figure 1) over pills were ‘The discomfort of having to take pills every day’ (52.8%) and ‘I think it would improve my quality of life’ (40.3%). Respondents mentioned in the open answer that they expect less digestive discomfort and more independence from the health system (no waiting for monthly refills, reduced engagement with health insurance bureaucracy, and increased freedom for travel). Conversely, the most common reasons to choose pills were convenience (60.3%) and safety and efficacy of pills (35.3%). Regarding the ‘convenience’ of pills, some participants stated in the open response that they have more control over pills and can manage if their health insurance is late for refill, while injectable PrEP could be limited by time and provider constraints. Considering the safety of pills, participants mentioned that they already know and are more comfortable with the pills’ side effects and think LAI could be ‘stronger’. Reasons did not differ across variables of interest.

Regarding the setting where they could receive treatment, 36.2% preferred to receive LAI at the doctor’s office, and 30.9% had no preferences among a physician’s office, a nursing office, a pharmacy, or by themselves.

Table 3. Characteristics of the sample and correlates associated with the preference of LAI for ART in people with HIV ($n=804$).

Characteristic	Total, $n=804$	Preference, n (%)		Statistical tests	p Value	OR (IC95%)
		LAI, $n=736$ (91.5)	Pills, $n=68$ (8.5)			
Age, median (IQR)	35 (30–43)	35 (30–42)	40 (31–50)	$U=20,260.00$	0.001	0.96 (0.93–0.98)
Gender + sexual orientation						
Cis Het women	184 (22.9)	160 (21.7)	24 (35.3)	$\chi^2=19,023$, $df=4$	0.001	–
Cis LBQ women	19 (2.4)	16 (2.2)	3 (4.4)			
Cis Het man	52 (6.5)	44 (6.0)	8 (11.8)			
Cis man GBQ	502 (62.4)	476 (64.7)	26 (38.2)			
Trans	47 (5.8)	40 (5.4)	7 (10.3)			
Nationality						
Argentina	750 (93.3)	685 (93.1)	65 (95.6)		0.427	–
Other	54 (6.7)	51 (6.9)	3 (4.4)			
Education level						
Up to incomplete secondary	66 (8.2)	51 (6.9)	15 (22.1)	$\chi^2=18,816$, $df=1$	0.000	3.790 (1.999–7.188)
High school or higher	736 (91.8)	683 (93.1)	53 (77.9)			
Place of residence						
AMBA	421 (52.4)	392 (53.3)	29 (43.3)		0.117	–
Province	382 (47.6)	344 (46.7)	38 (56.7)			
Use substances						
Yes	152 (18.9)	141 (19.2)	11 (16.2)		0.548	–
No	652 (81.1)	595 (80.8)	57 (83.8)			
Symptoms of depression						
Yes	241 (30.0)	227 (30.8)	14 (20.6)		0.077	–
No	563 (70.0)	509 (69.2)	54 (79.4)			
Received injectable medication						
Yes	789 (98.1)	725 (98.5)	64 (94.1)	$\chi^2=6546$, $df=1$	0.031^a	0.243 (0.075–784)
No	15 (1.9)	11 (1.5)	4 (5.9)			
Injection experience						
Good	662 (78.8)	576 (79.4)	46 (71.9)		0.155	–
Bad/indifferent	167 (21.2)	149 (20.6)	18 (28.1)			

(Continued)

Table 3. (Continued)

Characteristic	Total, n = 804	Preference, n (%)		Statistical tests	p Value	OR (IC95%)
		LAI, n = 736 (91.5)	Pills, n = 68 (8.5)			
Take treatment						
Yes	788 (98.0)	722 (98.1)	66 (97.1)		0.557	–
No	16 (2.0)	14 (1.9)	2 (2.9)			
Number of pills per day						
One	331 (42.0)	305 (42.2)	26 (39.4)		0.653	–
Two or more	457 (58.0)	417 (57.8)	40 (60.6)			

^aFisher's exact test.

AMBA, Área Metropolitana de Buenos Aires–Metropolitan area of Buenos Aires; ART, antiretroviral therapy; GBQ, gay, bisexual, and queer; IQR, interquartile range; LAI, long acting injectable; LBQ, lesbian, bisexual, and queer; OR, odds ratio.

Boldface indicates statistical significance.

Table 4. Multivariable logistic regression analysis of factors associated with preference of LAI for ART in people with HIV (n = 804).

Intercept and variables	β	Wald value	Prediction model	p
			Adjusted OR (95% CI)	
Intercept	2.443	12.495	11.502	0.000
Age	–0.031	5.877	0.969 (0.945–0.994)	0.015
Gender + sexual orientation				
Cis Het women	–	8.926	–	0.063
Cis LBQ women	–0.567	0.666	0.567 (0.145–2.215)	0.425
Cis Het man	–0.152	0.109	0.741 (0.859–0.348)	0.742
Cis man GBQ	0.701	5.000	2.015 (1.090–3.724)	0.025
Trans Het+ LGBQ	–0.095	0.036	0.850 (0.910–0.342)	0.850
Education level: High school or higher	0.990	7.693	2.691 (1.337–5.417)	0.006
Received injection	–1.344	4.243	0.261 (0.073–0.937)	0.039

Cox and Snell $R^2 = 0.043$, Nagelkerke $R^2 = 0.098$, –2 Log likelihood = 430.096.

ART, antiretroviral therapy; CI, confidence interval; GBQ, gay, bisexual, and queer; LAI, long acting injectable; LBQ, lesbian, bisexual, and queer; LGBQ, lesbian, gay, bisexual, and queer; OR, odds ratio; Ref, reference value. Boldface indicates statistical significance.

Preference for LAI-PrEP among people without HIV or unknown status

As shown in Table 5, people without HIV or unknown status were younger than people with HIV, with a median age of 31 years (IQR: 26–38). Most of them were cisgender heterosexual women

(56%). Half (53.3%) had heard of PrEP before. Only 39.4% reported that they always used condoms.

Regarding the modality of PrEP administration, 68% preferred injectable (15.8% of them every

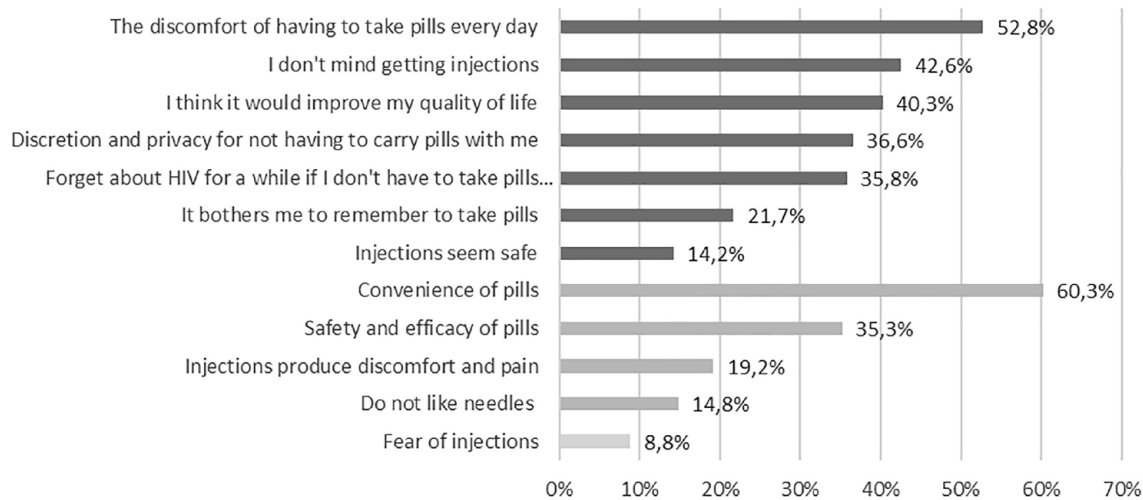


Figure 1. Reasons to choose LAI or pills for ART in people with HIV ($n=804$). ART, antiretroviral therapy; LAI, long acting injectable.

2 months and 84.2% every 6 months), 23.3% one pill per week, and 8.7% one pill per day. Preference of injectable PrEP was similar in all gender/sexual orientation groups: 72.7% cisgender heterosexual men, 70.5% cisgender lesbian, bisexual, and queer women, 68.4% cisgender heterosexual women, 65.9% transgender and non-binary people, and 65.6% cisgender gay, bisexual, and queer men. Preference for LAI-PrEP was positively associated with prior good experiences using injectable medication ($p < 0.05$).

The most common reasons to choose (Figure 2) injectable PrEP over pills were ‘I’m afraid of forgetting a pill’ (57.9%) and convenience (55.5%). Respondents elaborate in the open response stating that injections every 2 or 6 months are practical and similar to vaccination, and it is easier to receive one injection than to get pills refill more often. Among those who choose pills, the most common reasons for their preference were convenience of the pills (76.2%) and dislike for the injectable option (29.9%). Participants mentioned in the open response that pills are ‘convenient’ because they would not have to inject themselves; going to a health clinic for the injectable seems inconvenient, whereas taking pills at home feels more comfortable and private than asking for an appointment. A 2 or 6 months period of time between injections is too long and they might forget; forgetting one injectable dose seems more problematic than forgetting one pill,

and taking pills daily or weekly gives them more control and autonomy over medication. Reasons did not differ across variables of interest.

Regarding the place of administration, 36.9% had no preference, 22.9% chose the nurse office, and 18.9% doctor’s office.

Discussion

The present study assesses preferences for methods of ART among people with HIV and PrEP among people without HIV, as well as examines the correlations and reasons for these preferences in Argentina. Preference for LAI-ART, like previous studies (69–88%)^{13,22,23} was high among people with HIV (91.5%), while preference for LAI-PrEP (25–74%)^{3,12,15} was in the range (68%) among self-identified people without HIV or unknown status.

Moreover, LAI-ART preference was positively associated, as in previous studies, with cisgender gay, bisexual, and queer men, younger, and higher education and previous use of injectable medication.^{18,22,24} For young people, LAI-ART could be preferable because of their more hectic or unstable lifestyle that could lead to missing pills. Regarding education, it is possible that people with lower levels could believe that LAI would not be beneficial for them or fear its side effects. These findings underscore the need to tailor

Table 5. Characteristics of the sample and correlates associated with the preference of LAI for PrEP in people without HIV ($n=872$).

Characteristic	Total, $n=872$	Injectable PrEP, n (%)		Statistical tests	p Value	OR (IC95%)
		Yes, $n=593$ (68)	No, $n=279$ (32)			
Age, median (IQR)	31 (26–38)	31 (26–38)	31 (26–38)		0.763	
Gender + sexual orientation						
Cis Het women	488 (56)	334 (56.3)	154 (55.2)		0.857	
Cis LBQ women	95 (10.9)	67 (11.3)	28 (10.0)			
Cis Het man	33 (3.8)	24 (4.0)	9 (3.2)			
Cis man GBQ	215 (24.7)	141 (23.8)	74 (26.5)			
Trans	41 (4.7)	27 (4.6)	14 (5.0)			
Nationality						
Argentina	825 (94.6)	559 (94.3)	266 (95.3)		0.512	
Other	47 (5.4)	34 (5.7)	13 (4.7)			
Education level						
High school or higher	843 (97.2)	572 (97.1)	271 (97.5)		0.758	
Up to incomplete secondary	24 (2.8)	17 (2.9)	7 (2.5)			
Place of residence						
AMBA	495 (57.0)	334 (56.7)	161 (57.7)		0.781	
Province	373 (43.0)	255 (43.3)	118 (42.3)			
Use substances						
Yes	199 (22.9)	137 (23.1)	62 (22.2)		0.773	
No	673 (77.2)	456 (76.9)	217 (77.8)			
Symptoms of depression						
Yes	295 (33.8)	209 (35.2)	86 (30.8)		0.198	
No	577 (66.2)	384 (64.8)	193 (69.2)			
Chronic treatment						
Yes	346 (39.7)	232 (39.1)	114 (40.9)		0.625	
No	526 (60.3)	361 (60.9)	165 (59.1)			
Received injectable medication						
Yes	856 (98.2)	584 (98.5)	272 (97.5)		0.309	
No	16 (1.8)	9 (1.5)	7 (2.5)			

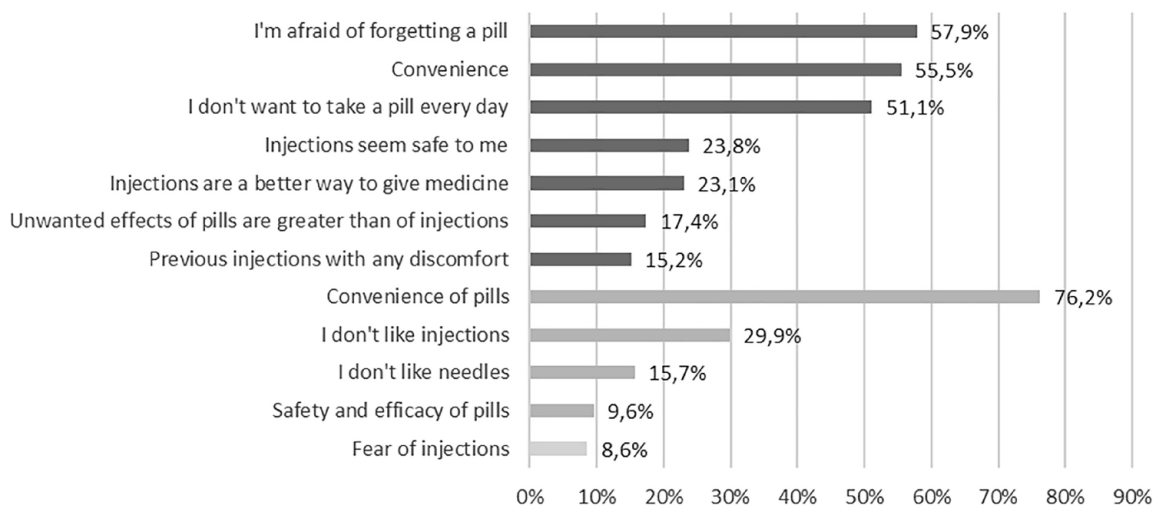
(Continued)

Table 5. (Continued)

Characteristic	Total, <i>n</i> =872	Injectable PrEP, <i>n</i> (%)		Statistical tests	<i>p</i> Value	OR (IC95%)
		Yes, <i>n</i> =593 (68)	No, <i>n</i> =279 (32)			
Injection experience						
Good	603 (70.4)	432 (74.0)	171 (62.6)	$\chi^2=11,462$, <i>df</i> =1	0.001	0.59 (0.43–0.80)
Bad/indifferent	254 (29.6)	152 (26.0)	102 (37.4)			
Condom use						
Always	336 (39.4)	225 (38.7)	111 (41.1)		0.922	
Usually	309 (36.3)	214 (36.8)	95 (35.2)			
Sometimes	102 (2.0)	70 (12.0)	32 (11.9)			
Never	105 (12.3)	73 (12.5)	32 (11.9)			
Heard about PrEP						
Yes	465 (53.3)	308 (51.9)	157 (56.3)		0.232	
No	407 (46.7)	285 (48.1)	122 (43.7)			

AMBA, Area Metropolitana de Buenos Aires-Metropolitan area of Buenos Aires; GBQ, gay, bisexual, and queer; IQR, interquartile range; LAI, long acting injectable; LBQ, lesbian, bisexual, and queer; OR, odds ratio; PrEP, pre-exposure prophylaxis.

Note: Boldface indicates statistical significance.

**Figure 2.** Reasons to choose LAI or pills for PrEP in people without HIV (*n*=872).

LAI, long acting injectable; PrEP, pre-exposure prophylaxis.

future LAI-ART intervention for those of older age and low level of education, and provide them with information about the beneficial aspects of new technology for HIV treatment, such as LAI.

Regarding frequency of LAI-ART, it was observed that those who choose one injection every 6 months were more likely to be using illicit substances. Although it was not clear why drug users

preferred a longer spacing between injections, this result is consistent with other studies that showed that some groups of people with HIV (e.g. youth, women using long-acting contraceptives) indicate a stronger willingness to switch to LAI-ART if the dosing frequency were 3 months or every 6 months. While currently available LAI-ART options are monthly or bi-monthly dosing, developers should consider more frequency options for different groups of people with HIV.^{25,26}

Regarding LAI-PrEP, consistent with previous studies,^{15,18,27} preference for LAI was positively associated with having prior good experience using injectable medication. Although fear of needles is one of the less reported concerns in the LAI-PrEP literature and our study shows that people with HIV are not conditioned by previous experiences with injectable medication, it should be pointed out that bad healthcare experiences could affect patients' future treatments or their continuation. This seems to be particularly true regarding people without HIV and less exposure to good or bad experiences in the healthcare system. LAI should be provided by well-trained health care workers that could provide a good experience to increase the chance of retention. Preference of LAI-PrEP did not differ between sex orientations or gender identities. They reported that this method modality could prevent them from missing doses and that it is convenient mostly because they could visit health care facilities fewer times than they would need to for pill refills. On the other hand, those who would prefer pills perceive them to be more convenient because there is no need to find a provider to administer as in the case of injection.

As participants answered the questionnaire based on subjective appraisals, personal beliefs, and prior information rather than experience of use, the perception of pills expectedly differed significantly between people with and without HIV. Given that people without HIV mentioned that they most likely would not administer the injection by themselves, their need to visit a health clinic to receive injections would present an inconvenience. Thus, taking pills would give them more control and autonomy over medication. Conversely, people with HIV that have more experience with the healthcare system and living with a chronic condition emphasized that LAI-ART would offer more independence from the

health system, freeing them of (the need for) monthly refills and health insurance bureaucracy.⁹ Also, the decreased preoccupation about missed doses and pill fatigue was highly valued by participants and many stated that LAI-ART could improve their quality of life. This response most likely implied that LAI-ART would increase their well-being in many areas of their life (better adherence, relationship with health care, more confidentiality and less stigma, among others). These findings are in line with other studies demonstrating that people with HIV highlight the benefits of convenience, better adherence, reduced disclosure, and improved emotional well-being of decreased stigma. On the other hand, other participants preferred to keep taking daily pills to have agency over problems with dosage and refills shortage and adverse effects.

As for convenience and preference of healthcare setting to receive LAI-ART, one-third chose the doctor's office and another third had no preference. Our findings are in line with other studies,²⁸ which report that regardless of the setting, it is important to consider that providers should be free of stigma and discrimination and help patients to overcome the challenges of the healthcare system (medication authorizations, procurement and storage, appointment availability, and others). Moreover, contrary to other studies, people with HIV showed no difference in LAI-ART preference between those reporting a bad experience using an injectable treatment compared to those reporting good experiences. This could imply that they placed more value in other benefits of LAI-ART than in the modality of administration. Further studies will be needed to explore more on how preconceptions and previous experiences with injectable methods and relationship with the health system would play a role in the implementation phase of the use of LAI-ART.^{7,11}

Limitations

Firstly, the participation of women was higher than expected, given that the NGO's Facebook and Instagram audience was 78.7% cisgender women. Efforts were made by asking activists and health promoters of the community to post the questionnaire in their social media and send it to their WhatsApp contacts in order to reach a significant number of participants, particularly people with HIV, and to disseminate this questionnaire

among gay, bisexual, and queer men and transgender and non-binary people. Nonetheless, this provides an opportunity to include cisgender women who, despite being affected, are an under-represented group in HIV prevention and treatment research.^{29,30} Moreover, studies among cisgender women are scarce, and these results raise new study questions regarding preference of LAI-ART and how this is associated with previous experience with other medications, including injectable and implantable contraceptives.

Secondly, online recruitment resulted in participants with a higher educational level, most likely because that is the population with higher internet access and likelihood of being reached by online questionnaires. Future studies should encourage more community participation particularly in transgender and non-binary people, who are key to LAI-ART and PrEP implementation.

Thirdly, since there are only few studies on different methods for ART and PrEP in Latin America, it is necessary to further explore LAI-ART and PrEP preferences in other countries of the region, mainly among the most vulnerable populations who will benefit the most from LAI, such as transgender and non-binary people. Despite transgender and non-binary people being vulnerable to HIV and encountering more discrimination in social and healthcare settings because of HIV, there is no greater preference for the use of LAI-PrEP compared to the other groups. It is possible that the sample was too small, and it remains to be seen in future studies the factors that impact in their choice.

Fourthly, we did not ask about PrEP eligibility, participation in clinical studies, and current use of PrEP because it was not widely available in Argentina at the time of the study. Although PrEP has been recently approved by the regulatory agency, the number of people receiving PrEP was limited to clinical trials and pilot projects under the Ministry of Health, resulting in most participants answering the questionnaire based on subjective appraisals rather than experience of use.

Fifthly, although we did not have a specific set of questions to evaluate ART adherence, most of the participants with HIV responded they were currently taking ART (98%). Further studies should explore perceptions and preference of ART methods among people with HIV who do not adhere to treatment.

Finally, since we used a quantitative approach and an online questionnaire, participants had limitations to express their opinions and explain their choices. Further qualitative studies could bring in-depth understanding of the reasons why people would or would not use LAI.

Conclusion

Overall, acceptance of LAI was high for both ART users and potential PrEP users. Participants expect that the use of LAI-ART antiretrovirals would positively impact adherence and general well-being because of decreased chances of missing doses and increased convenience compared to pills. Additionally, the preference for LAI-PrEP among those without HIV emphasizes the importance of considering this option for HIV prevention strategies. This study highlights the need to offer diverse methods for ART and prevention to accommodate different preferences and improve health care outcomes in Latin America. More information is needed related to the perspective of decision makers and health care providers for its implementation.

Declarations

Ethics approval and consent to participate

This study was reviewed and approved by the Ethics Committee of Fundacion Huesped, Argentina (Protocol No. FH-47, date of approval 8 March 2021). All study participants provided their informed consent electronically before initiating the web-based questionnaire. No identification of participants was collected.

Consent for publication

Not applicable.

Author contributions

Sergio Sciannameo: Conceptualization; Data curation; Formal analysis; Funding acquisition; Investigation; Methodology; Project administration; Supervision; Writing – original draft; Writing – review & editing.

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Luciana Spadaccini: Conceptualization; Data curation; Formal analysis; Methodology; Validation;

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Omar Sued: Conceptualization; Data curation; Formal analysis; Funding acquisition; Investigation; Methodology; Visualization; Writing – original draft; Writing – review & editing.

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Availability of data and materials

All the data are available on Dataverse. The data that support the findings of this study are available from the corresponding author, SS, upon reasonable request.

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Supplemental material

Supplemental material for this article is available online.

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