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A Conjoint Analysis of the Acceptability of Targeted Long-Acting Injectable Antiretroviral Therapy Among Persons Living with HIV in the U.S.

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Abstract

With long-acting injectable antiretroviral therapy likely to be a treatment option for people living with HIV (PLWH), it is critical to assess its acceptability among potential end-users. Based on formative qualitative work and our own ongoing development of targeted long-acting products in nanosuspension formulations, we created eight hypothetical medication scenarios varying along six dichotomous attributes: administration location (home versus [vs.] clinic), dosing frequency (every two weeks vs. one week), injections per dose (one vs. two), injection pain (mild vs. moderate), injection site reaction (mild vs. moderate), and effectiveness (better vs. same as pills). PLWH from three outpatient care clinics in Seattle, WA and Riverside, CA rated acceptability (i.e., willingness to try each hypothetical medication) from 0 (*very unlikely*) to 100 (*very likely*). In conjoint analyses, we examined level and correlates of acceptability, the impact of each attribute on overall acceptability, and moderators of this effect. Participants (median age 52 years; 71% male, 34% White, 36% Black/African American, 20% Hispanic) rated acceptability of the 8 scenarios from 47.8 (standard deviation [SD]=37.0) to 68.8 (SD=34.1), with effectiveness (impact score=7.3, SD=18.7, p=0.005) and dosing frequency (impact score=5.7, SD=19.6, p=0.034) the only attributes with a significant impact on acceptability. There were no statistically significant differences in overall acceptability according to any participant socio-demographic or other characteristic; however, gender, education, employment status, and experience with and hatred/avoidance of injections moderated some effects. Overall acceptability for targeted long-acting

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Declarations

Portions of this study were originally presented at the Adherence 2017 conference in Miami in June, 2017.

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

The authors have no financial conflicts of interest to declare.

antiretroviral treatment as proposed was modest, with superior effectiveness and lower dosing frequency most impactful on acceptability. Future acceptability research should continue to evaluate specific products in development with a full range of conjoint analytic and other techniques.

Keywords

targeted long-acting injectable ART; HIV treatment; acceptability; end-user preferences; HIV/AIDS; conjoint analysis

Introduction

Antiretroviral treatment is recommended for all persons living with HIV [1,2]. Despite improvements in the efficacy, tolerability, and convenience of antiretroviral therapy (ART) and modern “one-pill-a-day” regimens, 15%−40% of persons prescribed ART in the United States are unable to maintain sustained virologic suppression [3,4]. Multiple strategies have been proposed to support adherence, including behavioral interventions [5,6] and long-acting treatments such as implants, micro-needle patches, and injectable formulations [7].

One long-acting injectable (LAI) treatment regimen currently in late-stage development combines intramuscular injections of cabotegravir and rilpivirine; this regimen has been highly effective and well accepted despite requiring an oral lead-in period to achieve viral suppression before use, separate injections of each medication, and frequent injection site reactions [8–10]. Because the intramuscular injections required for this regimen must be administered in a clinic, this regimen involves a considerable burden in terms of patient time and implementation in a busy HIV care setting.

Much earlier in development is targeted long-acting combination ART (TLC-ART), a technology used to transform existing antiretroviral drugs into nanosuspension formulations with LAI pharmacokinetics and the potential for home administration by subcutaneous injection [11–13]. Pharmacokinetic characteristics of TLC-ART formulations given by subcutaneous injection have been modeled based upon non-human primate data [11,12], but the characteristics in humans, including the optimal frequency of injections, are not yet known.

While TLC-ART formulations tested to date in primates appear to be well tolerated, data on long-term tolerability of serial subcutaneous doses of TLC-ART formulations produced under good manufacturing practices are unavailable, even for non-human primates. It is also unknown whether persons living with HIV would be interested in a regimen they could administer once every week or two by self-injection at home. The ability to modify characteristics of TLC-ART formulations during future development prompted interest in understanding the opinions of potential end-users about the features of the TLC-ART formulations and the relative importance individuals place on different regimen characteristics.

One marketing research method used to assess preferences for evaluation, selection, and continuation of a given product is conjoint analysis [14,15]. This approach assumes that a proposed product or service can be described in terms of a list of key "attributes," each of which has different levels or "values." Overall evaluation of a specific product is based on its particular combination ("conjoint" or "scenario") of attributes' values. Traditional research methods that inquire about end-user preferences for each attribute one-by-one risk ceiling effects (all may be viewed favorably), and attributes can be difficult to evaluate in isolation from each other. For example, all participants may prefer a less (versus [vs.] more) painful injection or a longer (vs. shorter) dosing interval, but this type of assessment yields no data on how participants prioritize preferences and their relative importance in determining overall acceptability. In conjoint analysis, end-users are presented with different scenarios and asked to comparatively rate different attributes. This enables the computation of the impact of each individual attribute on overall product acceptability. Beyond yielding data on the relative importance of various attributes of a TLC-ART regimen, conjoint analysis allows us to predict which profile (i.e., regimen with a particular set of attributes) will be most acceptable to a specific target population. This approach has been shown to be valid in estimating actual medication choices [16]. In the HIV arena, researchers, including members of our team, have used conjoint analysis to determine patient preferences for HIV testing [17–19], vaginal microbicides [20], rectal microbicides [21], HIV vaccines [22], clinical services [23], pre-exposure prophylaxis (PrEP) [24,25], and ART regimens [26].

In conjoint analysis, the selection of attributes and values is a critical first step. For the current study, we identified six dichotomous attributes of a potential TLC-ART regimen that were deemed most likely to influence acceptability. These were based on the regimens currently in development in the TLC-ART program [11–13], as well as a literature review and consultation with experts. Additionally, we conducted 7 focus group discussions with HIV providers and subgroups of potential end-users [27]. The key attributes consistently mentioned by patients when discussing the hypothetical TLC-ART regimen were efficacy (i.e., at least as effective as pill-based regimens) and having minimal side effects. Fear of needles and dislike of injections was another important theme, but the ensuing discussions revealed that these could be mitigated by other considerations, such as preferred bodily site of injection, needle size, number of injections and injection volume, and whether injections could be done at home.

The objective of the current study was to measure preferences among potential end-users for characteristics of a proposed TLC-ART regimen currently in development. These preferences will likely relate to future interest in and success with this type of long-acting product.

Methods

Setting and Recruitment

Research was conducted between June 2016 and September 2017. We chose a university-affiliated urban HIV primary care clinic (Madison Clinic) and its satellite for patients needing additional adherence support (Max Clinic) in Seattle, Washington as well as a primary care clinic in suburban Riverside, California in order to obtain a diverse sample.

Recruitment involved clinic personnel making initial contact with eligible patients, who were ≥18 years of age and English speaking. Clinic personnel briefly described the study and referred interested individuals to study staff consenting and scheduling. Participants were purposively selected to represent a range of potential end-users, including men who have sex with men (MSM), heterosexual men, females, young adults, and persons known by providers to have adherence challenges. All participants who completed study procedures received a $35 gift card and transportation reimbursement. Institutional review boards at the University of Washington and University of California, Los Angeles provided human subjects approval; all participants provided written, informed consent.

Procedures

We conducted a conjoint analysis in line with best practices [28]. For each, we designated a priori likely preferred and not preferred values, noted respectively: administration location (home vs. clinic), dosing frequency (every 2 weeks vs. 1 week), injections per dose (one vs. two), injection pain (mild vs. moderate), injection site reaction (mild vs. moderate), and effectiveness (better vs. same as pills). Side effects were excluded from consideration, as they are expected to be less severe in any injectable formulation approved for clinical use. We created hypothetical TLC-ART medication conjoints (here referred to as “scenarios”) representing specific combinations of the six dichotomous attributes chosen. A full factorial design would have required the comparative evaluation of 64 possible combinations (2^6=64). To avoid this unwieldy burden on participants, we followed a common convention in conjoint research that employs a fractional factorial orthogonal design to reduce the number of scenarios to eight, with each attribute/level combination appearing the same number of times [29].

In small groups or individually, participants first completed a short survey of socio-demographic items, information on their medication-taking, and history and preferences with respect to injections. Next, they viewed the hypothetical medication scenarios individually described on a set of eight laminated cards. The cards were color coded rather than numbered or lettered and randomly shuffled prior to each administration to preclude any presentation of value bias. Detailed instructions were provided by the facilitator, including a thorough explanation of the attributes and their values. Participants were asked to compare the eight scenarios and rate each in terms of acceptability (i.e., willingness to take the medication if it were available to them) by putting them in one of five piles labeled *very unlikely, somewhat unlikely, neutral, somewhat likely,* and *very likely.* Upon completion, the facilitator discussed the evaluation process with the participant to ensure its comprehension and accuracy, allowing for changes in ratings. Notes were taken on the explanations for each rating. Conjoint administrations lasted approximately 30 minutes.

Analyses

The acceptability of each TLC-ART scenario was derived by averaging scores across participants, which ranged in 25-point intervals from 0 (*very unlikely*) to 100 (*very likely*). Impact scores were estimated in two steps. In Step 1, for each participant, a multiple regression model was fit to his or her acceptability scores Y_i for the eight scenarios, where

i==1, .., 8. The six attributes A_p, where p==1, .., 6, served as independent variables in the model. The mathematical representation of the model is:

$$Y_i = = ß0 + \Sigma ß_p A_p + \varepsilon_i$$

where Σ is a summation over the six regression coefficients $ß_p$ and attributes and ε_i is a residual error term. The regression coefficient for each attribute is the impact score of the attribute on acceptability for the individual participant. Since all the independent variables are dichotomous, the mathematical representation of the impact score for each attribute simplifies to the net difference in mean acceptability score between the four scenarios with the preferred value and the four scenarios with the non-preferred value. In Step 2, we averaged the individual impact scores for each attribute across participants to get the overall impact of the attribute on acceptability. The study was sufficiently powered for our main analyses: six one-sample *t* tests to determine the statistical significance of the independent impact of each attribute on acceptability. No a priori sub-group analyses of impact were planned. In exploratory analyses with diminished statistical power, we looked at the association of socio-demographic and other key variables on overall impact scores using *F* tests, and used two-sample *t* tests to look at potential moderators of the association of attributes and acceptability.

Results

Participant Characteristics

Of the final sample of 56 participants, 49 were recruited from Seattle and 7 (all young adults) were recruited from Riverside. Median age was 52 years (range 20 to 64), 40 (71%) were male, and 43 (76%) had graduated from high school. Twenty (36%) were Black/African American, 19 (34%) were White, and 11 (20%) were Hispanic. Notably, 25% reported currently self-injecting a prescription medications or illegal substance. See Table I for a full description of the participants.

Full-Profile Conjoint Analysis

Overall acceptability.—As seen in Table II, acceptability scores, indicating the likelihood of the participant taking each of the 8 hypothetical TLC-ART medication scenarios if it were available to them, ranged from 47.8 (standard deviation [SD]=37.0) to 68.8 (SD=34.1). The overall acceptability score was 57.9, corresponding to a score between 50 (*neutral*) and 75 (*somewhat likely*). The top-rated scenario had the following attributes: administered at the clinic, every 2 weeks, in two injections per dose, with mild injection pain and site reaction, and more effective than pills. There were no statistically significant differences in overall acceptability according to any participant socio-demographic or other characteristics (overall *F* test *p* values ranged from 0.19–0.98; data not shown). For example, with respect to injection experience, the 24 participants who had ever self-injected did not differ significantly from the 32 who had never self-injected in terms of overall acceptability rating (62.4 vs. 54.5, respectively, *p*== 0.19).

Influence of attributes.—Table III summarizes the main analyses of the impact of each of the 6 attributes on overall acceptability. The impact score is the difference between the average acceptability ratings for the scenarios with the "preferred" vs. "non-preferred" attribute value. Analyses revealed that two attributes significantly impacted overall acceptability: effectiveness (better than pills vs. same as pills) had the highest impact (7.3, SD==18.7, p==0.005), followed by dosing frequency (every 2 weeks vs. every 1 week; 5.7, SD=19.6, p=0.034). The impact scores for the four other attributes had no statistically significant effect on overall acceptability.

In subsequent exploratory analyses, the impact of attributes on acceptability was shown to be moderated by certain participant characteristics. As seen in Table 3, we looked at each of the six attributes separately. There were no significant moderators for *dosing frequency*; in other words, the difference in overall acceptability ratings for scenarios with dosing every 2 weeks vs. every week did not vary by the levels of any potential moderators. For each of the five other attributes, however, the two-sample t tests revealed one or two moderators.

For *administration location*, participants who had ever injected themselves with prescription or illicit drugs rated the scenarios with "home" location as more acceptable than those with "clinic" (impact: 20.1, SD=38.2). The opposite was true for the participants who had never injected themselves; they preferred the scenarios with "clinic" over "home" locations (impact: −23.8, SD=42.9). For *injections per dose*, participants with at least a high school degree showed little preference for 1 vs. 2 (impact: −1.5, SD=14.9), whereas those without a high school degree were more likely to favor 1 over 2 (impact: 11.1, SD=20.0). In terms of *injection pain*, males (impact: 0.2, SD=15.9) and those employed (impact: −4.6, SD=13.0) showed little variance in acceptability between mild and moderate pain; females (impact: 10.2, SD=11.4) and those unemployed (impact: 6.1, SD=15.4), on the other hand, favored scenarios with mild vs. moderate pain. For *injection site reaction,* participants who somewhat/strongly agreed that they hate getting injections and avoid them when possible rated mild vs. moderate reaction rather comparably (impact: 2.5, SD=17.3). The participants who somewhat/strongly disagreed (i.e., they did not hate or avoid injections) rated the scenarios with a mild reaction as more acceptable that those with moderate reactions (impact: 11.5, SD=14.1). Finally, superior *effectiveness* was important to working participants (impact: 21.3, SD=22.9) but not those unemployed (impact: 2.0, SD=14.3).

Discussion

This study of PLWA in the western United States yielded important empirical data on anticipated characteristics relevant to the acceptability of subcutaneously administered TLC-ART nanosuspension formulations currently in development, including the impact of specific attributes on acceptability. Notably, overall acceptability was 57.9, which is between *neutral* and *somewhat likely*. Our findings are consistent with other acceptability studies conducted by our team, according to which the overall HIV vaccine acceptability score among potential users in the U.S. was 54.5 [22] and the overall PrEP acceptability among potential users in Peru was 53.4 [25]. In a sample of people who use drugs recruited from a methadone clinic in the northeastern U.S., overall PrEP acceptability averaged 56.2 [30]. Therefore, the overall acceptability score estimated in our study may provide a reliable and

realistic estimate of potential uptake among potential users of TLC-ART with attributes similar to those we analyzed.

Our findings further suggest that the eventual degree of acceptability of different TLC-ART regimens may be influenced by their specific attributes. Notably, two attributes were identified as potentially affecting acceptability – efficacy and dosing frequency. Moreover, PLWH placed higher importance on efficacy (explained as "compared to HIV medication in pill form, the injected medication would be as effective or more effective in fighting HIV [that is, lowering your viral load and raising your T-cell count]") than on dosing frequency. It should be noted that these results were specific to the values chosen for these attributes, which were based on products in development. Overall, our results suggest that as long as the TLC-ART regimen works as well as or better than daily pills and administration frequency is not too burdensome, PLWH may be willing to tolerate potential side effects, less preferred injection sites, and even moderately adverse site reactions. It may be that PLWH would even find regimens with comparable effectiveness to oral pills to be preferable under scenarios in which burden can be minimized.

Some limitations of our study should be noted. First, the small sample size ($N = 56$) and the non-random recruiting strategy limit our ability to generalize findings and to examine site differences. However, the purpose of this study was to elicit and explore acceptability of potential future TLC-ART regimens among select potential users, rather than to generalize our findings to all persons living with HIV. The small sample size also limited our power to identify main effects of socio-demographic and other characteristics on overall acceptability or moderators of these effects; however, the study was powered sufficiently for the overall conjoint analyses of the independent fixed effect of attributes on acceptability. Second, our sample consisted mostly of participants who reported relatively high adherence to oral HIV regimens, with 80% reporting "good" to "excellent" HIV medication adherence (although we had no access to viral load data to confirm this self-report). Given that future TLC-ART regimens could be beneficial for those with suboptimal adherence to an oral regimen, our findings might underestimate the level of acceptability.

Third, we focused mainly on product attributes, not delivery and system attributes, and as noted, our findings are based on two specific levels for each product attribute, determined according to current research on actual products with subcutaneously administered nanosuspension formulations at the time the study was designed. Varying levels of attributes could have an impact on participants' overall acceptability. For example, participants in our study preferred a dosing frequency of every 2 weeks vs. every week. Other LAI-ART formulations currently under investigation have less frequent dosing schedules of 4 to 8 weeks and use intramuscular injection [8–10]. Offering different options for dosing frequency and administration route could potentially influence participants' acceptability ratings.

Fourth, conjoint analyses as we employed them in this study treated attributes of the hypothetical regimen as orthogonal and assessed only independent fixed effects. Other methods, such as discrete choice experiments (DCE), allow for the exploration of trade-offs between different regimen or product choices and the investigation of possible interactions

among attributes [31–34]. With DCE, instead of asking potential users to comparatively rate hypothetical scenarios, they are shown the hypothetical scenarios in a series of pair-wise comparisons and asked to choose their preferred option in each. By examining the frequency with which attributes occur among the 8 hypothetical choices made (i.e., counting the number of “wins”), one can estimate the impact of each attribute on patient choices, more clearly identifying potential trade-offs. DCE have been utilized to examine ART product preferences [35,36], HIV clinical services [37–40], and biomedical HIV prevention technologies [41–43], including PrEP [44,45]. Finally, preferences or stated intentions do not necessarily predict future actions and, indeed, product ratings have been shown to change after actual experience with a product [46]. However, in research that focuses on products not yet available for testing, these approaches are vital to help guide drug development and, indeed, are the only option. While studies of actual choice behaviors with investigational drugs may be preferred if these products are available, participants in these early phase trials are often selected for their stated interest and are not representative of the general patient population. This may partly explain, for instance, why 99% of participants in the injectable treatment arm of the LATTE-2 trial reported being “highly satisfied” to continue their LAI-ART [8]. Clearly, there are limitations to either approach to assessing preferences.

Despite these limitations, our study findings provide useful empirical data on TLC-ART acceptability among potential users, highlighting the importance of effectiveness and of dosing frequency for the potential acceptability of this treatment modality. Moreover, the sample included many participants with experience self-injecting, which is an important subsample to investigate. Future efforts are needed to explore the acceptability of TLC-ART and other LAI-ART approaches with a larger sample and an overrepresentation of PLWH who are challenged by current pill-based regimens. As PLWH with adherence challenges are the most likely end-users for LAI-ART, meaningful engagement to examine specific preferences require careful investigation. We used attributes and levels predicated by subcutaneously administered nanosuspension products currently in development; future studies should also incorporate attribute choices reflective of other investigational regimens. Further research might consider diverse end-user populations both in the U.S. and globally, as well as other methods for evaluating acceptability (e.g., DCE) [41–43]. These should be powered sufficiently to look for potential moderators of any correlates of acceptability. Indeed, in a forthcoming project, we will conduct a more in-depth exploration of LAI-ART acceptability using separate DCE designed and pilot tested in the US and in Kenya, leading to a larger-scale quantitative assessment with adequate power for the identification of predictors.

Although we found no differences in LAI-ART acceptability across any socio-demographic or other characteristics, several variables moderated the impact of certain attributes on acceptability (e.g., gender, education, employment, experience with self-injections and hatred/avoidance of injections). Future research might further investigate these preliminary findings, which, if confirmed, might lead to future targeted social marketing and education campaigns around LAI-ART rollout. Some factors, such as lack of experience self-injecting and hatred/avoidance of injections, are potentially modifiable factors that could be overcome with teaching and packaging or devices to help with injection safety. Finally, other delivery

modes for long-acting treatment, such as implants or patches, are under investigation and merit further acceptability testing [7,47].

Improvements in adherence and persistence to antiretrovirals, in whichever format an individual prefers, are needed to meet global targets. Acceptability research such as that presented here will help to ensure future options are amenable to PLWH, which will ultimately determine their success in sustaining virologic suppression.

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Table I

Description of Participants (N=56)

Characteristics	Median (Range) or N (%)
Clinic	
Seattle—Madison Clinic	40 (71)
Seattle—Max Clinic	9 (16)
Riverside	7 (13)
City	
Seattle	49 (88)
Riverside	7 (13)
Age (years)	52 (20–64)
Female	16 (29)
Race	
Black/African-American	20 (36)
White	19 (34)
Other/Mixed/None of the above	17 (30)
Hispanic/Latino/Chicano	11 (20)
Education	
Some primary	2 (4)
Some secondary	11 (20)
High School Graduate or GED	24 (43)
Associates degree or technical school	15 (27)
College or advanced graduate (BA/BS)	4 (7)
Employment	
Not working	40 (73)
Working part-time	6 (11)
Working full-time	9 (16)
Monthly income	
$0–999	35 (64)
$1,000–1,999	15 (27)
$2,000 or more	5 (9)
Lifetime sexual partners	
Mostly or only same sex	18 (32)
Both sexes equally	11 (20)
Mostly or only opposite sex	27 (48)
Living situation	
Own/family’s house/apartment	31 (55)
Someone else’s house/apartment	9 (16)
No stable living situation	16 (29)
Years since HIV diagnosis	
≤1 year	3 (5)
2–5 years	10 (18)

Characteristics	Median (Range) or N (%)
6–10 years	9 (16)
>10 years	34 (61)
When initiated HIV medications	
≤1 year	9 (16)
2–5 years	11 (20)
6–10 years	10 (18)
>10 years	26 (46)
# daily pills for HIV medications	
1	27 (48)
2	14 (25)
3+	15 (27)
# times per day of HIV medication	
1	50 (89)
2	5 (9)
3+	1 (2)
Primary mode of transport to pharmacy	
Mailed or delivered	14 (25)
Walk/ride or bicycle	4 (7)
Bus or other public transportation	31 (55)
Taxi/own car	5 (9)
Other	2 (4)
Time to get to pharmacy	
<30 minutes	23 (56)
30 minutes to 1 hour	14 (34)
>1 hour	4 (10)
Prescribed any other (non-HIV) medications	37 (66)
# daily pills of non-HIV medication	
1	7 (19)
2	4 (11)
3+	25 (69)
# times per day of non-HIV medication	
1	22 (61)
2	10 (28)
3+	4 (11)
# days missed 1+ dose of HIV medication (last 30 days)	
None	21 (38)
1	8 (14)
2	7 (13)
3+	20 (36)
HIV medication taken as prescribed (last 30 days)	
Never	6 (11)
Rarely	3 (5)

Characteristics	Median (Range) or N (%)
Sometimes	4 (7)
Usually	5 (9)
Almost always	16 (29)
Always	22 (39)
How well took HIV medications in the way supposed to? (last 30 days)	
Very poor	4 (7)
Poor	4 (7)
Fair	4 (7)
Good	6 (11)
Very good	20 (36)
Excellent	18 (32)
Result of last HIV viral load test	
Undetectable	44 (79)
Detectable	5 (9)
Don’t know	7 (13)
Experience with self-injections	
Never	32 (57)
A few times	10 (18)
Regularly	14 (25)
Currently self-inject	15 (27)
Experience with giving injections to others	
Never	42 (75)
A few times	7 (13)
Regularly	7 (13)
Hate getting injections and try to avoid whenever possible	
Strongly agree	17 (30)
Somewhat agree	8 (14)
Neither agree or disagree	19 (34)
Somewhat disagree	5 (9)
Strongly disagree	7 (13)

Table II

Acceptability of Hypothetical Long-Acting Injectable ART Scenarios among Persons Living with HIV ($N = 56$)

		Attributes					
Acceptability Mean (SD)	**Medication Scenario**	**Administration Location**	**Dosing frequency**	**Injections per dose**	**Injection pain**	**Injection site reaction**	**Effectiveness**
68.8 (34.1)	1	Clinic	2 weeks	Two	Mild	Mild	Better than pills
62.1 (39.0)	2	Home	2 weeks	One	Moderate	Moderate	Better than pills
59.4 (40.9)	3	Clinic	1 week	One	Moderate	Mild	Better than pills
57.1 (36.8)	4	Clinic	1 week	One	Mild	Moderate	Same as pills
56.3 (36.7)	5	Clinic	2 weeks	Two	Moderate	Moderate	Same as pills
55.8 (40.7)	6	Home	2 weeks	One	Mild	Mild	Same as pills
55.8 (38.7)	7	Home	1 week	Two	Mild	Moderate	Better than pills
47.8 (37.0)	8	Home	1 week	Two	Moderate	Mild	Same as pills

Note. Participants rated acceptability of taking the medication scenario if it were available to them on a 5-point scale from 0 (*very unlikely*) to 100 (*very likely*). For injection site reaction, “mild” was defined as involving *one or two* symptoms (such as rash, swelling, or soreness) that would be *mildly* painful/annoying and would last for *a day or two*. A “moderate” reaction was defined as involving *at least two* symptoms that would be *moderately* painful/annoying and would last *at least two days*.

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Table III

Impact of Attributes on Hypothetical Long-Acting Injectable ART Acceptability (N=56)

Attributes (Preferred vs. Non-preferred)		**Acceptability of Scenarios with Preferred Attribute**	**Acceptability of Scenarios with Non-preferred Attribute**	**Impact on Acceptability**		
	N	**Mean†**	**Mean‡**	**Mean (SD)§**	**p value1**	**p value2**
Administration Location *(Home vs. clinic)*	56	55.4	60.4	−5.0 (46.1)	0.419	
Experience with self-injections						
Never self-injected	32	42.6	66.4	−23.8 (42.9)		Referent
Ever self-injected	24	72.4	52.4	20.1 (38.2)		<0.001
Dosing frequency *(Every two weeks vs. weekly)*	56	60.7	55.0	5.7 (19.6)	0.034	
Injections per dose *(1 vs. 2)*	56	58.6	57.1	1.5 (16.9)	0.523	
Education						
<High school/GED	13	63.9	52.9	11.1 (20.0)		Referent
≥High school graduate	43	57.0	58.4	−1.5 (14.9)		0.018
Injection pain *(Mild vs. moderate)*	56	59.4	56.4	3.0 (15.4)	0.148	
Gender						
Male	40	57.8	57.7	0.2 (15.9)		Referent
Female	16	63.3	53.1	10.2 (11.4)		0.026
Employment						
Not working	40	61.7	55.6	6.1 (15.4)		Referent
Working part-/full-time	15	52.1	56.7	−4.6 (13.0)		0.021
Injection site reaction *(Mild vs. moderate)*	56	57.9	57.8	0.1 (16.4)	0.960	
Hate and avoid injections						
Somewhat/strongly disagree	12	67.2	55.7	11.5 (14.1)		Referent
Neither agree/disagree	19	52.6	56.3	−3.6 (13.7)		0.006
Somewhat/strongly agree	25	57.5	60.0	−2.5 (17.3)		0.020
Effectiveness *(Better than pills vs. same)*	56	61.5	54.2	7.3 (18.7)	0.005	
Employment						

Attributes (Preferred vs. Non-preferred)		Acceptability of Scenarios with Preferred Attribute	Acceptability of Scenarios with Non-preferred Attribute	Impact on Acceptability		
	N	Mean†	Mean‡	Mean (SD)§	p value1	p value2
Not working	40	59.7	57.7	2.0 (14.3)		Referent
Working part/full-time	15	65.0	43.8	21.3 (22.9)		<0.001

SD = standard deviation

†Mean acceptability for the four profiles with the preferred value of each attribute

‡Mean acceptability for the four profiles with the non-preferred value of each attribute

§Impact on acceptability = difference in mean acceptability between four hypothetical LAI-ART profiles with preferred value and the four hypothetical profiles with non-preferred value

1*p* value for the impact of LAI-ART attribute on mean acceptability, using one-sample t-test

2*p* value for the impact of LAI-ART attribute on mean acceptability, using two-sample t-test to compare groups with the referent group