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Patterns of a rectal microbicide placebo gel use in a preparatory stage for a Phase I trial among young men who have sex with men

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Abstract

We examined young gay, bisexual, and other men who have sex with men's (YGBMSM) usage patterns of a pre-coital, applicator-administered rectal placebo gel. An ethnically diverse sample of 94 YGBMSM (aged 18 to 30 years) were asked to insert hydroxyethylcellulose placebo gel rectally before receptive anal intercourse (RAI) and report their gel use through an Interactive Voice Response System (IVRS) across 12 weeks. We used trajectory analyses to characterize participants' use of the rectal gel over the 12 weeks, and examine whether these trajectories varied based on participants' sociodemographic characteristics, sexual behaviors, application and insertion behaviors, and experiences using the placebo gel. A cubic model was the best fit for these longitudinal data, with two distinct trajectories of gel use observed. The first trajectory ('High with Varying Gel Use per Week') represented YGBMSM (N=38; 40.3%) who reported using the rectal

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Compliance with Ethical Standards

Ethical approval: 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.

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Informed consent: Informed consent was obtained from all individual participants included in the study.

gel on several occasions per week. The second trajectory ('Low and Consistent Gel Use per Week') represented participants (N=56; 59.7%) who reported a consistent average use of one gel per week. Participants in the High with Varying Gel Use Trajectory reported trying out a greater number of positions when inserting the gel across the 12-weeks than peers in the Low and Consistent Gel Use Trajectory. YGBMSM reporting more RAI occasions during the trial were more likely be present in the High with Varying Gel Use Trajectory than peers in the Low and Consistent Gel Use Trajectory. Future research examining how to facilitate gel application and adherence among YGBMSM is merited.

Keywords

acceptability; prevention; HIV/AIDS; gay; rectal microbicide; applicator satisfaction

INTRODUCTION

Gay, bisexual, and other men who have sex with men (GBMSM) accounted for 67% of all new HIV infections in the United States in 2014 (1). GBMSM aged 13 to 24 years represented 92% of all new HIV infections among men in their age group, and over 25% of new infections are among all GBMSM. Alongside condoms and oral pre-exposure prophylaxis (PrEP) with combination emtricitabine/tenofovir disoproxyl fumarate, researchers and advocates have promoted innovative, topical biomedical interventions (e.g., rectal microbicides; 2–3), as they may be a suitable alternative to condoms, may help overcome PrEP-related acceptability and adherence challenges, and ultimately provide an additional strategy to reduce men's risk of HIV acquisition.

Rectal microbicides (RM) are products currently under development that, if found to be effective, could prevent or significantly reduce the risk of HIV infection from anal sex (4). Ensuring GBMSM's acceptability and adherence to RM candidates is crucial to determine these products' clinical safety profiles and potential efficacy as an HIV prevention modality (5–10). Further, RM acceptability and adherence data can often inform next steps when researchers are testing competing RM formulations and/or designing tools for RM application and insertion (6, 11–15). To achieve consistent and correct use among future consumers, researchers must develop products perceived to be desirable *and* acceptable, both within the context of clinical trials and in the real world. Morrow and Ruiz (15) have identified key factors associated with product acceptability, including gel-specific traits (e.g., satisfaction with gel, formulation side-effects), applicator-specific characteristics (e.g., ease and comfort of use, ease carrying applicator), and contextual factors associated with its use (e.g., sexual behaviors, sexual satisfaction when RM is used during anal sex). These domains have begun to be examined with new RM formulations and applicators (5, 7, 9, 16); however, we know little of young GBMSM's (YGBMSM) acceptability of, and adherence to, RM products.

The ability to characterize and predict patterns of RM use (or non-use) is critical to develop behavioral strategies that support product use and adherence (17). Most RM studies to date have assumed homogeneity in GBMSM's patterns of use and/or employed statistical

methods that minimize the heterogeneity within the sample by estimating an averaged proportion or rate of use during the trial. In addition, most clinical research examining usage patterns of RM candidates have required brief periods of product use given the uncertainty of these formulations' safety parameters. As a result, behavioral scientists have had limited opportunities to examine whether MSM's RM patterns of use vary over longer periods. Among prospective behavioral studies, researchers have often characterized patterns of use based on retrospective cumulative indicators (e.g., total amount of product used during the trial). This approach has diminished researchers' ability to consider whether there are differences in when (i.e., timing) and how often (i.e., quantity) a RM product is used among participants enrolled in a trial, and/or to examine whether there are distinct patterns of use among trial participants. Examining the temporal variation in RM use among YGBMSM is vital, as it may inform the development of personalized adherence strategies based on distinct user profiles.

The goal of this study was to characterize YGBMSM's use of a rectal placebo gel during receptive anal intercourse (RAI) over a 12-week period. Our study builds upon the existing literature in several ways. First, we used an interactive voice reporting system (IVRS) to examine YGBMSM's weekly usage patterns of a rectal placebo gel rather than relying on participants' retrospective cumulative answers in a self-administered questionnaire. Second, we used a placebo product to reduce the ethical and safety concerns associated with long-term exposure to an active and untested RM candidate. Third, we employed a prospective modeling strategy (i.e., group-based trajectory analysis) to model and characterize YGBMSM's gel use over time, and examine whether distinct patterns of use (i.e., trajectories) emerged within our sample. Finally, building on Morrow & Ruiz's acceptability framework (15), we tested whether these distinct product use trajectories differed by YGBMSM's sociodemographic characteristics, sexual practices, and overall experiences with the RM placebo.

METHODS

Sample

Study data come from a larger project called Microbicide Safety and Acceptability in Young Men (18, 19). The study received IRB approval from all participating institutions. After written informed consent and screening (Stage 1A), YGBMSM participated in a run-in period in which they were asked to apply a rectal placebo gel (hydroxyethylcellulose, HEC) using a rectal-specific applicator over a three-month period (Stage 1B), followed by a safety trial in which participants applied tenofovir 1% gel using a vaginal applicator for rectal delivery of the gel for seven days (Stage 2). A vaginal rather than a rectal applicator was used in the safety trial (Stage 2) because the former is the only applicator for which the stability and compatibility of tenofovir 1% gel has been established. The study took place in three sites: Pittsburgh, PA, Boston, MA, and San Juan, PR. Study candidates were recruited from clinics, bars, clubs, newspaper advertisements, and social networks. Recruitment materials indicated that the investigators were looking for YGBMSM (ages 18–30 years) for a study about their sexual health and their feelings about inserting rectally a placebo gel resembling a microbicide gel currently under development prior to receptive anal sex.

Procedures

Stage 1A – Screening—Participants underwent an eligibility pre-screening by phone or in person to determine age, same sex sexual behavior, and presumed negative HIV status. Those who appeared eligible after pre-screening were invited to the clinic for in-person screening (Visit 1). Eligibility criteria included being sexually active (operationalized as at least one RAI episode in the prior month) and engaging in some potential risk behavior. To cast a wide net for the epidemiological objective of Stage 1A (i.e., prevalence of HIV/rectal sexually transmitted infections (STIs)), potential risk behavior was operationalized as at least one episode of condomless RAI in the prior *twelve* months. After informed consent procedures, participants answered a medical history and received a physical exam including a digital rectal exam and anoscopy. Specimens were collected to test for HIV and STIs. YGBMSM had to be HIV-uninfected to be eligible for the study. YGBMSM identified as HIV-positive during Screening (Stage 1A) were excluded from the study and referred to care. Research staff made themselves available to participants with reactive HIV tests to provide support or additional follow-up, to the extent that the participants wanted. HIV testing and counseling was provided during the remaining stages of the trial. In addition, participants completed a Web-based Computer-Assisted Self-Interview (CASI) that included demographic questions among other topics. HIV counseling and condoms were provided at all visits.

Stage 1B – Three-month non-clinic placebo use—Participants returned to the clinic within 28 days (Visit 2) and were informed of their test results. From those who received medical clearance, we selected those fulfilling the more stringent eligibility criterion of having had condomless RAI within the prior *three* months. This allowed us to focus on those with more recent potential risk and invite them to enroll in Stage 1B. Those participants completed a new informed consent process, received risk reduction counseling and condoms, and updated their medical history. They then received 20 rectal applicators filled with a placebo gel and instructions to insert the entire contents of one applicator rectally within 90 minutes prior to each RAI episode or, in the absence of RAI, to insert at least one applicator per week. We used an applicator specifically designed for the delivery of a rectal microbicide, filled with HEC gel. HEC is also known as the “universal placebo” because of its use as placebo in most gel microbicide trials. YGBMSM were told that the gel did not provide any protection against HIV/STIs and received counseling on HIV/STI risk reduction and condom use. Six weeks after Visit 2, participants returned for the Mid-trial Follow-up Visit (Visit 3) at which point their medical history was reviewed and updated, any reported adverse event was further explored, a physical exam including digital rectal exam and anoscopy was performed, samples were collected for STI and HIV testing if clinically indicated, and used and unused applicators were collected, counted, and recorded. Twenty new rectal applicators containing HEC were then dispensed. Six weeks after Visit 3, participants returned for the Final Follow-up Visit of Stage 1B (Visit 4). All procedures of Visit 3 were repeated, except no additional rectal applicators were dispensed. Additionally, participants completed a web-based CASI and semi-structured interview that included questions on gel and applicator use.

Throughout the 12 weeks of product use, participants were asked to call an IVRS (20) every time they inserted the study gel and/or had RAI or, in the absence of either for 7 consecutive days, to call at least weekly to report that no gel use or RAI occurred. Participants were provided a toll-free phone number and an individual participant identification number. The system asked participants to report the number of occasions in which the gel was used since their prior call. Given that participants could call more than once per week into the IVRS, we aggregated YGBMSM's data by week to ensure parallel structure in our datasets. Responses were entered by pressing keys or by speech. The system recorded date and time of call. Participants who did not call in six days received an automated follow-up call that prompted them to answer the questionnaire. Participants who did not call in a given week were coded as missing for that week. One participant did not use the IVRS and was subsequently excluded from this analysis.

Compensation

Participants received $50 for each study visit (4 visits for Stage 1AB and 5 visits for Stage 2), an additional $50 for each visit that included a biopsy for the Stage 2 safety trial, and $50 for each video teleconference interview completed. They also received $1 per applicator returned at visits 2, 3 and 10 plus maximum incentives of $60 in Stage 1B and $40 in Stage 2 for reporting their product use consistently by phone during the trial. The maximum a participant could earn by adhering to all visits and procedures from the first to the last visit of the study was $898.

Measures

In addition to the IVRS data, structured and semi-structured data were collected via a web-based CASI. A descriptive summary of these variables is included in Table I.

Demographics—Demographic information included age, race/ethnicity (White, Latino, African American, Mixed, or Other), and sexual orientation (1=Gay; 2=Bisexual).

Sexual Behavior—We used a modified version of the Sexual Practices Assessment Schedule at baseline to estimate YGBMSM's number of sexual partners, the number of RAI occasions, and the number of condomless RAI occasions in the prior three months. At the end of the 12-week trial, YGBMSM were asked to report their total number of partners, as well as their number of RAI occasions (with and without condoms) in the prior three months.

Pre-coital douching—We also asked YGBMSM to report how often they had used a douche or enema prior to inserting the gel (1=None of the occasions, 2=A few of the occasions, 3=Some of the occasions, 4=Most of the occasions, 5=All of the occasions).

Gel Insertion—Participants were asked to select all the positions they had used when applying the gel: kneeling, laying on side, standing, squatting or seated over a toilet or tub, or other position (e.g., lying on back (n=4), standing with one leg up (n=1)). We computed a total sum score, where higher scores indicated that YGBMSM had tried multiple insertion positions.

Applicator Satisfaction—Participants also rated their satisfaction with the rectal applicator. We ascertained their satisfaction by examining their perceived ease and comfort with the application process and their satisfaction with the applicator using 9 items rated on a series of 10-point scales (1=Disliked very much/Very difficult, 10=Liked very much/Very easy). We computed a mean score across these 9 items (α=.89), where higher scores indicated greater satisfaction with the applicator.

Gel Satisfaction—Participants rated their satisfaction with the gel on a 10-point scale (1=Disliked very much; 10=Liked very much). Participants answered three items specific to their experience using the product: their overall satisfaction with the gel, their immediate satisfaction with the gel, and their satisfaction with the gel after 30 minutes. We computed a mean score across these three items (α=.90), where higher scores indicated greater satisfaction with the gel. We also asked participants to rate whether RAI with the gel was better, worse, or no different from other occasions when the gel was not used.

Perceived Side Effects—Participants were presented with 10 potential side effects (e.g., leakage, bloating, soiling, gassiness, pain). For each side effect, they were asked to recall how frequently it occurred while using the gel (0=None, 1=Some, 2=A Lot), and subsequently rate on a 10-point scale how bothered they felt by each side effect (0=Not bothered at all; 9=Extremely bothered). We computed a composite score for both mean frequency of side effects and mean side effect discomfort. Recognizing that greater occasions of side effect frequency and discomfort were highly correlated and would be expected to have a multiplicative effect rather than an additive effect on future gel use, we created a total perceived gel side effects score by multiplying the two mean composite scores (α=.78).

Future Gel Use—Participants reported their likelihood of using the gel in the future on a 10-point scale (1=Not likely; 10=Extremely likely) across 6 different scenarios: use with lover, use with one-night stand, use with other types of partners, use without condoms, use if there were a 30 minute delay prior to sex, and use while under the influence of substances. We computed a mean score across these six scenarios (α=.81), where higher scores indicated greater future use intentions.

Data Analytic Strategy

We used the PROC TRAJ command (21) in SAS v. 9.4 to conduct the group-based trajectory analysis on YGBMSM's weekly IVRS reports of gel use. These trajectories allowed us to identify and cluster participants reporting similar gel use patterns over the 12 weeks of the trial. The Expectation Maximization (EM) algorithm was applied throughout the trajectory analysis to handle missing data. Given the count nature of our outcome, we employed a Poisson model when estimating the trajectories of gel use across the 12 weeks. Once trajectories were estimated (see TABLE II), we computed participants' probability of group membership into the most suitable trajectory. Finally, we examined whether participants' group membership into either trajectory was associated with their sociodemographic characteristics, sexual and douching behaviors, and experiences with the application process, and/or the gel using a t-test for continuous variables and Chi-Squared test for categorical

variables. Due to our limited sample size, we relied on bivariate analyses to compare the trajectories (see Table I).

RESULTS

Study participants (*N*=94) had a mean age of 23 years. The racial/ethnic composition of the sample was predominantly Latino (49%) and White (35%), followed by a fewer number of African American (10%) and Mixed/Other Race (6%) participants. Most participants identified as gay (86.2%).

Trajectories of Gel Use

We first modeled the longitudinal data for all participants into a single non-linear trajectory. A cubic model was found to be the best fit for these longitudinal data (see Model 1; Table I). After modeling the rate of change for gel use in our sample, we examined whether YGBMSM's trajectory of gel use could be parceled into multiple trajectories, reflecting diverse patterns of use among YGBMSM in our sample. A two-trajectory solution was ultimately selected based on sample size, theoretical interpretation, and model fit statistics (see Model 2; Table I). Examination of the 95% confidence intervals for each trajectory indicated no overlap between the two trajectories of gel use across the 12-week study. The first trajectory (High Use Trajectory) indicated that YGBMSM used 2–3 gels per week on average, with some fluctuation in use across the 12-weeks of the trial. The second trajectory (Low and Consistent Use Trajectory) suggested that YGMBM consistently used 0–1 gels per week throughout the trial period.

As shown in Figure 1, the first cubic (e.g., S-shaped) trajectory ('High with Varying Gel Use per Week') represented YGBMSM (N=38; 40.3%) who reported using the rectal gel on several occasions per week. Over time, participants in this trajectory reported some variability in their gel use per week. The second trajectory ('Low and Consistent Gel Use per Week') represented participants (N=56; 59.7%) who reported a consistent average use of one gel per week. Given that participants had a Mid-Trial Visit (Visit 3) to obtain more study product, we examined whether the shape of our estimated trajectories would differ if we statistically treated the trials as two sub-studies (e.g., one trajectory analysis for Weeks 1–6; another trajectory analysis for Weeks 7–12). No significant differences were found, thus our sensitivity analyses were found to support our 12-week trajectory analyses (data not shown).

Once our trajectories were estimated, we examined whether YGBMSM's trajectory membership was associated with sociodemographic characteristics, sexual practices before or during the trials, and their experiences with the trial product. We observed no baseline differences in trajectory membership by age, race/ethnicity, or sexual orientation (see Table II). We also observed no differences in YGBMSM's pre-coital douching practices or number of sexual partners at baseline or follow-up.

When we compared trajectory membership with YGBMSM's self-reported follow-up data, participants in the High with Varying Gel Use Trajectory reported trying out a greater number of positions when inserting the gel ($t_{(df=93)}$=2.16, p=.03). YGBMSM who reported greater number of RAI occasions during the trial were more likely present in the High with

Varying Gel Use Trajectory than peers in the Low and Consistent Gel Use Trajectory ($t_{(df=93)}$=5.19, p=.001). We observed no trajectory differences based on YGBMSM's number of sexual partners, self-reported satisfaction with the applicator or the gel, sexual satisfaction when using the gel, perceived negative side effects, or likelihood of using the gel in the future (see Table II).

DISCUSSION

Identifying an effective RM candidate requires study participants to use and consistently adhere to a study product, as failure to ensure high adherence may compromise the clinical safety and efficacy endpoints of a clinical trial. In this study, we identified and characterized the product use trajectories reflected in a sample of YGBMSM enrolled in a trial where they were asked to use a HEC placebo gel with RAI over 12 weeks. Using YGBMSM's weekly reports through the IVRS, we observed two distinct trajectories of product use. Given that at least one dose per week was the protocol requirement, this low trajectory may reflect participants' adherence to protocol requirements regardless of RAI. Although the overall sample's adherence to the protocol requirements are promising for future RM studies with YGBMSM, our trajectory analyses underscore the importance of testing for heterogeneity in RM usage patterns among trial participants.

Informed by Morrow and Ruiz's microbicide acceptability framework (15), we examined whether YGBMSM's likelihood of being classified into either trajectory was associated with sociodemographic characteristics (e.g., age, race/ethnicity), sexual practices (e.g., RAI occasions, douching), gel-specific traits (e.g., satisfaction with gel, formulation side effects), application-specific characteristics (e.g., applicator satisfaction), or contextual factors associated with its use (e.g., sexual satisfaction when using the product). Although acceptability domains were rated positively by YGBMSM in our study, gel use trajectories did not differ by YGBMSM's sociodemographic characteristics, gel-specific traits, applicator satisfaction, or other contextual factors associated with its use. In this study, participants reported positive gel acceptability, but we found no association between gel use trajectories and any elements of the microbicide acceptability framework. The absence of an association between YGBMSM's patterns of use and these acceptability correlates indicates a need to revisit Morrow and Ruiz's framework, as factors implicated in product acceptability may differ from those linked to product use and adherence.

Willingness to insert the gel in different positions (e.g., lying on side, standing, squatting, or kneeling) was linked with YGBMSM's trajectory of use. YGBMSM in the High Use Trajectory were more likely than peers in the Low Use Trajectory to report trying out multiple positions when inserting the gel. It remains unclear whether YGBMSM in the High Use Trajectory were more intrinsically motivated to try different insertion positions (e.g., felt more comfortable with their body), and/or whether they had greater extrinsic motivation (e.g., support) from their sexual partners. Future research examining what motivates YGBMSM's to persist in their insertion attempts may be warranted, as it may inform strategies to promote gel use (16). Future RM trials should also ensure that YGBMSM are educated on how to insert the gel and encouraged to try different positions until they found

one that is comfortable, particularly since applicator-assisted gel application differs from the traditional application of a sexual lubricant prior to sex.

YGBMSM's number of sexual partners throughout the trial was not associated with RM use patterns; however, it remains unclear whether the association with RAI occasions is confounded by the characteristics of YGBMSM's sexual partners. Prior research suggests that partner type (e.g., hookup, friend with benefits, romantic partner) might affect likelihood of sexual roles and influence risk reduction negotiation (e.g., condom use) (22–23), as well as their willingness to use a RM during sex in the future (24). Taken together, these findings suggest the need to extend the RM agenda to include partner-level studies (25). By examining dyadic relationships, we might be able to identify key relational characteristics that promote gel use and inform the development of partner-level interventions to promote RM product acceptability, use, and adherence.

Several factors limit the generalizability of these study results. Participants were not randomly selected and are not representative of YGBMSM in the cities where the research was conducted. Age of the participants may make results not generalizable to older populations. Participants volunteered for a rectal microbicide study and received significant financial remuneration if they participated in all stages of the trial; therefore, YGBMSM may have been particularly interested in this kind of product and have been subject to social desirability. By eligibility criteria, all participants acknowledged having URAI in the prior three months, and although URAI is not *per se* a risk behavior unless partners are serodiscordant and, as of late, not on oral PrEP, lack of consistent condom use may have heightened participants' risk perception and willingness to try and adhere to rectal microbicide use. Furthermore, it is possible that use of a gel with an active microbicide component may have resulted in different levels of use. Unfortunately, the limited sample size for Phase 2 and short period diminished our ability to examine product use trajectories among this sub-sample. As a safe RM product advances through the clinical trial phases, it will be important to explore YGBMSM's trajectories of use with an active product over longer periods. Finally, we used a newly designed rectal applicator as part of Stage 1B. Therefore, it is possible that the specific characteristics of this applicator, as compared to the vaginal applicators used in prior RM studies, influenced the evaluation that participants made of the applicator and how it was used. Future research examining how to optimize the design, appeal, and satisfaction with microbicide-delivered methods may be warranted.

These limitations notwithstanding, our study makes important contributions for the design and implementation of future rectal microbicide trials. Given the association between gel use and the frequency with which YGBMSM reported RAI, future rectal microbicide safety and efficacy trials where YGBMSM are required to use the product during sex may benefit from recruiting YGBMSM who engage in RAI frequently. Further, alongside cumulative indicators of product use, we encourage others to employ prospective modeling strategies (e.g., group-based trajectory analysis, growth curve modeling). These approaches will help characterize different user profiles, pinpoint temporal shifts in usage patterns, and identify psychosocial factors linked to long-term product use. As the RM agenda advances towards an efficacious product (4), these data will serve to inform future interventions focused on uptake and adherence.

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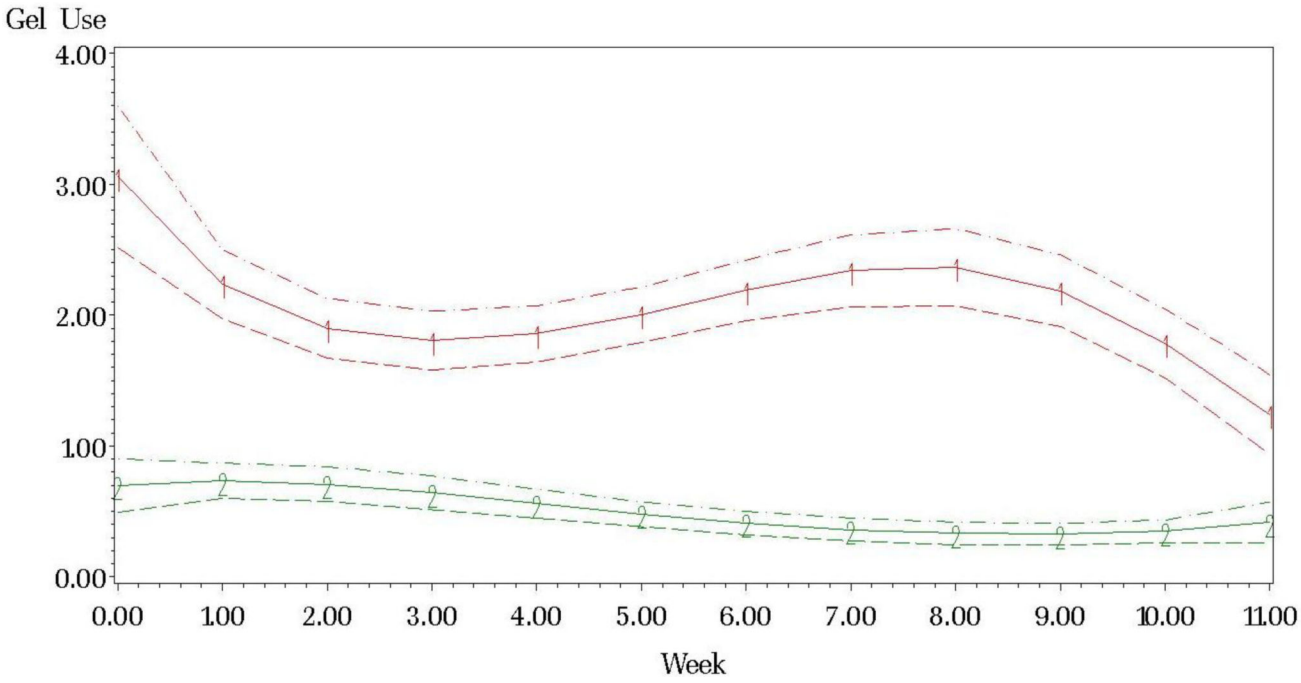

Figure 1. Trajectories of Weekly Gel Use as reported through an interactive voice recording system (IVRS) by participants in a 12-week rectal placebo gel trial

Notes. Group 1: High with Varying Use N=38 (40.3%); Group 2: Low with Stable Use N=56 (59.7%)

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Table I

Differences by Trajectory Membership in a sample of young gay and bisexual men participating in a 12-week rectal placebo gel trial

	Overall Sample	Trajectory 1 (N=38)	Trajectory 2 (N=56)	*t/X²*	*p*
	M(SD)/N(%)	M(SD)/N(%)	M(SD)/N(%)		
Age	23.19 (3.25)	23.29(3.47)	23.13(3.12)	.24	.81
Race/Ethnicity				5.32	.15
White/European American	33(35.1%)	9 (9.6%)	24 (25.5%)		
Black/African American	9 (9.6%)	24 (25.5%)	22 (23.4%)		
Latino/Hispanic	46 (48.9%)	3 (7.9%)	6 (10.7%)		
Mixed/Other	6 (6.4%)	2 (2.1%)	4 (4.3%)		
Sexual Orientation				.02	.88
Gay	81 (86.2%)	33 (35.1%)	48 (51.1%)		
Bisexual	13 (13.8%)	5 (5.3%)	8 (8.5%)		
Pre-Coital Douching	1.74 (1.27)	1.68 (1.20)	1.79 (1.32)	−.41	.68
Number of male sexual partners (Baseline)	5.74 (9.39)	7.34 (12.71)	4.66 (6.12)	1.21	.23
Number of male sexual partners (Follow-up)	3.51 (5.09)	3.92 (4.24)	3.24 (5.61)	.66	.51
RAI Occasions (Baseline)	12.66 (16.28)	14.22 (17.70)	11.63 (15.34)	.75	.46
RAI Occasions (Follow-up)	17.20 (15.49)	27.27 (15.78)	10.81 (11.47)	5.19	.001
Condomless RAI Occasions (Baseline)	8.86 (15.95)	10.73 (18.04)	7.63 (14.44)	.92	.36
Condomless RAI Occasions (Follow-up)	7.62 (12.14)	10.68 (14.54)	5.56 (9.84)	1.87	.07
Position when inserting gel (check all that apply)	1.19 (.55)	1.34 (.58)	1.08 (.51)	2.16	.03
Kneeling	21 (22.4%)	12 (12.8%)	9 (9.6%)	3.14	.08
Laying on side	35 (37.2%)	19 (20.2%)	16 (17.0%)	4.45	.04
Standing	29 (30.9%)	8 (8.5%)	21 (22.3%)	2.87	.09
Squatting	17 (18.1%)	9 (9.6%)	8 (8.5%)	1.35	.25
Other	10 (10.6%)	3 (3.2%)	7 (7.4%)	.51	.48
Applicator Satisfaction	7.58 (1.74)	7.93 (2.05)	7.35 (1.47)	1.58	.12
Gel Satisfaction	7.76 (1.95)	8.03 (2.03)	7.57 (1.89)	1.10	.28
Sexual Satisfaction with Gel[1]				2.98	.23
Better	34 (37.4%)	18 (19.8%)	16 (17.6%)		

	Overall Sample	Trajectory 1 (N=38)	Trajectory 2 (N=56)	t/X^2	*p*
	M(SD)/N(%)	M(SD)/N(%)	M(SD)/N(%)		
No Different	55 (60.4%)	19 (20.9%)	36 (39.6%)		
Worse	2 (2.2%)	1 (1.1%)	1 (1.1%)		
Perceived side effects	.19(.34)	.15 (.23)	.21 (.40)	−.66	.47
Future Gel Use	8.45 (1.36)	8.68 (1.32)	8.31 (1.37)	1.30	.20

Notes. RAI refers to receptive anal intercourse.

Table II

Trajectory Estimation and Group Membership among a sample of YGBMSM (N=94) participating in a 12-week rectal placebo gel trial

	Model 1			Model 2					
	Single Trajectory Analysis			Trajectory 1 (High & Varying Use)			Trajectory 2 (Low & Consistent Use)		
	b(SE)	***t***	***p***	**b(SE)**	***t***	***p***	**b(SE)**	***t***	***p***
Intercept	.50(.07)	7.01	.0001	1.12(.09)	12.40	.0001	−.36(.14)	−2.41	.02
Linear	−.27(.07)	−4.09	.0001	−.40(.08)	−5.02	.0001	.10(.13)	.73	.47
Quadratic	.05(.01)	3.61	.001	.09(.02)	5.05	.0001	−.05(.03)	−1.72	.09
Cubic	−.003(.001)	−3.57	.001	−.006(.001)	−5.12	.0001	.004(.002)	1.90	.05
Probability of Membership									
N=94 (100%)				N=38 (40.3%)			N=56 (59.7%)		
Model Fit Statistics									
BIC	−1833.45 (N=94)			−1595.42 (N=94)					
AIC	−1828.37			−1583.98					

Notes. BIC = Bayesian Information Criterion; AIC = Akaike Information Criterion