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A feasibility study of the use of HIV self-tests in young men who have sex with men

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Abstract

Studies on HIV self-testing (HIV-ST) have been limited to adults (age 18+). The study assessed use of HIV-ST among a diverse group of young men who have sex with men (YMSM) in the United States (US) and assessed differences in uptake by demographic characteristics and requirements for parental consent. This study demonstrated feasibility of HIV-ST for YMSM as young as 14 years of age, which suggests potential for increasing HIV testing in this young age group and promoting health equity.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Keywords

HIV/AIDS; lesbian/gay/bisexual/transgender persons; prevention; screening; sexual health; adolescent health

Introduction

The UNAIDS' 95-95-95 targets for ending AIDS by 2030 sets the following goals: 95% of people living with HIV (PLWH) should be diagnosed with HIV, 95% of those diagnosed with HIV should be taking antiretroviral therapy (ART), and 95% of those on ART should be virally suppressed (UNAIDS, 2015). These targets can only be reached if PLWH are aware of their diagnoses, with HIV testing being a crucial entry point for uptake of HIV prevention and treatment services (Weinhardt et al., 1999). Challenges remain in reaching these goals even in the United States (US)where the overall HIV testing rates remain below the 95% targets with only 79% of young men who have sex with men (YMSM)(ages 18-24 years) being tested for HIV, with no national data available for those under 18 years of age (Centers for Disease Control and Prevention, 2016).

HIV testing is especially important for men who have sex with men (MSM) in the US who have disproportionately high rates of HIV. In 2019, two-thirds of new HIV infections in the US occurred among MSM, despite MSM only making up 2% of the adult population. There were an estimated 692,900 MSM living with HIV. Of those, 85% had received a diagnosis. In one study, White MSM living with HIV were more likely to have received a diagnosis (90%) than Black MSM living with HIV (83%) and Hispanic/Latino MSM living with HIV (80%) (Pitasi et al., 2021). Disparities in HIV testing and, therefore, unrecognised infections extend beyond racial and ethnic minority MSM with major gaps in testing also being noted among young people, including YMSM at high-risk for HIV. In the aforementioned study, MSM ages 13–24 years living with HIV were least likely to have received a diagnosis (55%) (Pitasi et al., 2021). Similarly in another study, only 55% of youth ages 13–24 with HIV were aware of their serostatus (Ibitoye et al., 2021). Factors contributing to low testing rates include fear of stigma and confidentiality, particularly among adolescent and young adult populations. There are low testing delays accessing care and becoming virally suppressed among youth in this age group (Ibitoye et al., 2021).

One tool for overcoming barriers to HIV testing among youth is the HIV self or home test. Many studies examining the use of this prevention tool have thus far been limited to those who are 18 years of age or older due to barriers with parental consent (Brown et al., 2016; Sanabria et al., 2021; Wood et al., 2021). To date, we identified a very limited number of studies of HIV home testing in youth under 18 with one study in 16–27 years examining their attitudes and perceptions towards HIV-ST; findings suggested that youth from the Tampa Bay area noted a positive response to the use of home self-testing kits but indicated that they still preferred clinic over home testing when asked for preferred testing location (Zhang et al., 2021). Two pilot randomised controlled trials (RCTs) within the Adolescent Trials Network-LYNX and MyChoices aimed to increase HIV/STI testing among YMSM (age 15–24) who had not recently tested for HIV and were at high risk for HIV acquisition

across five US cities (Biello et al., 2019; Liu et al., 2019). The pilot data supported the use of HIV self-testing (HIV-ST) and STI self-collection kit ordering via mobile apps as feasible and acceptable (Biello et al., 2021). Given the limited data that is currently available on HIV home testing in YMSM and the disproportionate incidence of new HIV infections in these YMSM, our study team sought to better examine the feasibility of the use of HIV-ST among very YMSM who had recently completed a mobile delivered HIV prevention intervention trial. The purpose of this study was to assess the feasibility of HIV-ST among very YMSM and to examine differences in uptake by demographic characteristics and requirements for parental consent.

Methods

Between November 2020 and July 2021, we recruited YMSM who had completed the MyPEEPS Mobile Trial (NCT03167606), a national HIV prevention intervention study. Details of the clinical trial and eligibility criteria are described elsewhere (Kuhns et al., 2020). In short, the MyPEEPS Mobile Trial was a two-arm RCT among racially and ethnically diverse sexual minority young men. Participants were randomised to either the MyPEEPS Mobile intervention or a delayed intervention comparison condition and followed for up to 12 months. Eligibility criteria include: (1) ages 13–18 years; (2) assigned male sex at birth and, at the time of enrollment, self-identify as male; (3) understand and read English; (4) live in the US; (5) own a smartphone; (6) report sexual interest in other men; (7) has either kissed another man or plan on having sex with a man in the next year; and (8) self-reported HIV-negative or unknown HIV status. Our final sample is described here (Schnall et al., 2022) and was comprised of 763 participants with 85 participants residing in rural-designated areas; 736 participants were male, 13 non-binary; and 6 genderqueer; 37% identified as White, 21% as Black or African American, 9% as Asian, 6% as American Indian or Alaskan Native, and 1% as Native Hawaiian or other Pacific Islander. Forty-one percent of participants of all race groups identified as Hispanic or Latino. All MyPEEPS Mobile participants were between the ages of 14 and 21 years at the time of recruitment for this pilot study. To be eligible for the pilot study, individuals had to be HIV-negative or unknown status (self-reported), agree to be contacted for future studies (as part of the MyPEEPS Mobile consent). Data were collected in REDCap and the study visits were facilitated via video. In the enrollment visit, we verified the identity of potential participants (via a government or school ID), and, for participants under 17 years of age, we obtained parental e-consent as well as participant e-assent, since the OraQuick In-Home HIV test is only FDA approved for use by those 17 years of age and older. Participants were then mailed an HIV-ST kit (OraQuick In-Home HIV Test), and, when received, they completed a video visit in which they used the HIV-ST test and answered survey questions about their characteristics, health, and behavior. If the participant was non-reactive on the HIV-ST test, our study team provided information on HIV prevention resources; if reactive, our study staff linked them to HIV care for a confirmatory test. All study procedures were approved by the Columbia University Institutional Review Board. Participants were provided a $40 electronic gift card for completion of the study visits.

We compared the characteristics of parent study MyPEEPS Mobile participants (Kuhns et al., 2020) with pilot study participants in bivariate analysis using independent samples t-tests

or Chi-square tests. Because participants who were at least 17 years of age did not require parental permission, in addition to using age as a continuous variable, we also dichotomised it as age 17 or older versus under age 17 for analysis. Factors with a *p*-value lower than .20 in the bivariate analysis were entered into the final multivariable logistic regression model to assess significant factors associated with HIV-ST participation. Multi-collinearity (variance inflation factor ≥5) of the factors was assessed before including them in the final model. Odds ratios (OR) and associated 95% confidence intervals (CI) were used to assess the strength and directions of the associations. Finally, we performed a subgroup analysis of the significant factors associated with HIV-ST participation by removing those who lost follow-up from the parent study and those whose phone numbers were no longer in service. All statistical analyses were performed using SAS version 9.4 (SAS Institute Inc., 2014).

Results

Two hundred fifty-three (33.3%) of the participants from the MyPEEPS Mobile Trial agreed to participate in the HIV home testing pilot. Four hundred sixty-two youths did not participate in the pilot study, and reasons for non-participation are detailed in Table 1. Three hundred eight youths whom we re-contacted from the trial did not respond to our text messages or voicemails. Eleven youths from the MyPEEPS Mobile Trial did not want to participate in this pilot study because they were concerned about their privacy, with explanations such as they did not have a place to have the package mailed that would remain private or they did not have a private location to take the video study visit. Eleven youths were unwilling to participate because they did not want to ask parental permission. Six youths did not want to receive an Amazon electronic gift card as a form of compensation for their time. Notably, four participants from the MyPEEPS Mobile Trial reported seroconversion. Descriptive statistics of the overall sample as well as the bivariate associations between HIV-ST participation and other factors are presented in Table 2.

Based on the bivariate associations, five variables, continuous baseline age, sexual orientation, primary language spoken at home (Spanish versus English), having a primary care provider, and father's education, were included in the final multivariable logistic regression model. Mother's education was not included in the final model due to high multi-collinearity. Individuals who were more likely to participate in HIV-ST reported the primary language spoken at home was Spanish (OR = 1.68, *p*-value = 0.02) compared to those whose primary language was English. There was a trend of significance for older participants to be more likely to participate in HIV-ST (OR = 1.10, *p*-value = 0.09). Those who identified as "mostly gay" in terms of sexual orientation were less likely to participate in the home test compared to those who were "only gay" (OR = 0.57, *p*-value = 0.01). Having a primary care provider and father's education were not significant in the multivariable model. We also performed a subgroup analysis (n = 615) by removing those who lost follow-up in the parent study (n = 136) or those whose contact numbers were no longer in service (n = 16). Results were similar to the full sample; the significant factors were Spanish as the primary language spoken at home (OR = 1.69; *p*-value = 0.03), those who identified as "mostly gay" (OR = 0.57, *p*-value = 0.02), and age at baseline (OR = 1.14; *p*-value = 0.04).

Discussion

Findings from this study have a number of important implications for future use of HIV-ST among YMSM. This is especially salient given that YMSM, particularly youth under the age of 18, have been under-represented in HIV prevention and HIV testing research, and, yet, YMSM continues to be at very high-risk for acquisition of HIV. In summary, older youth and those whose primary language at home is Spanish were more likely to complete HIV-ST while those who identified as “mostly gay” were less likely to complete HIV-ST. Healthcare engagement factors such as having a primary care provider and having a history of HIV testing were not associated with uptake of HIV-ST. While healthcare engagement is often associated with preventive behavior (Krist et al., 2017), in this case, it was neither a facilitator nor barrier to HIV-ST, thus making it an option not tethered to prior healthcare experience.

However, the association between Spanish speaking at home and HIV-ST uptake was somewhat surprising. Limited English proficiency is associated with less consumption of healthcare services more generally (Foiles Sifuentes et al., 2020). In this case, participants from Spanish-speaking households may have been more likely to use the HIV-ST because they were less likely to have a primary care provider. In our study 63% of individuals who were from Spanish-speaking households reported having a provider versus 73% from English-speaking households, which is similar to findings from other investigators (Bennett et al., 2020). While older age was associated with HIV-ST, we found no difference in HIV-ST participation based on the age of consent without parental permission (age 17) despite our hypothesis that parental permission would stymie youth from participating in this study. These findings should be interpreted with caution, despite their promise for research and HIV prevention delivery with youth, because 11 participants from the MyPEEPS Mobile Trial did state that they were unwilling to participate in the study because they did not want parental involvement. This further supports the need for policy consideration on whether the HIV-ST should be limited to youth who are 17 years of age or older (Cordoba et al., 2022; Schnall et al., 2014). We carefully considered whether access to healthcare services was related to HIV-ST participation and examined if having a primary care provider was significantly associated with HIV-ST use. It was not, and, so, it is unlikely that our Spanish-speaking participants were more likely to use the HIV-ST because they did not have a primary care provider. On the other hand, nearly half of new HIV infections among Latinos are diagnosed among native Spanish speakers not born in the US, and 39% of primarily Spanish-speaking Latinos in the US have lower literacy skills (Baer et al., 2009) and, therefore, may have more difficulty accessing HIV testing services. This is notable since HIV testing sites may not be able to offer on-demand Spanish language HIV testing information if there are limited interpreter services (Merchant et al., 2015).

This study was limited to the assessment of the characteristics of those who were willing to participate in the HIV-ST study. Further, we did not collect qualitative data as part of this study and, so, we don’t have information about how the participants felt about using the HIV-ST, whether the availability of an HIV-ST would make them more likely to get tested, or if a positive of negative result changes their behavior. In other studies, people who test negative are inclined to be more protective of their negative status (McMahon et

al., 2021) rather than being more risk-prone because they are over-confident. Understanding preferences about clinic versus HIV-ST is also an important area for further study. Finally, the cost of the OraQuick test is prohibitive for many under 17 years of age and, so, this is also an important factor which may limit access to the HIV-ST.

Further examination is warranted in understanding why youth who identify as only gay were more likely to participate in the HIV home testing study than youth who identify as mostly gay (bisexual). Past studies have shown that youth who are bisexual have a lower perception of the risk of HIV acquisition since heterosexual activity is perceived as less risky than homosexual behavior (Robinson & Espelage, 2013). Future studies with larger and more diverse samples may be needed to further examine and better understand these differences and findings.

There are several limitations to this study. First, there is likely sampling bias given that we limited our sample to those youth who had completed participation in MyPEEPS Mobile, a mobile delivered HIV intervention study. Second, this study was cross-sectional and, so, it is difficult to understand how these HIV self-testing behaviors and situational considerations, especially during the COVID-19 pandemic, may have influenced youth's behavior (Jiang et al., 2020).

Conclusions

This study demonstrates the feasibility of using HIV-ST in youth as young as 14 years. Further, examination of the current regulatory decisions related to using the HIV-ST in youth under 17 years is warranted. Finally, HIV-ST may be a useful tool for reducing disparities in HIV testing among YMSM by age and racial and ethnic minority status.

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Table 1.

Reason for non-participation in HIV-ST pilot (N = 462).

	N
Did not respond to contact from study staff	308
Too busy/not interested	90
Number is no longer in service	16
Concerned about privacy	11
Did not want to ask for parental permission	11
No Show	13
Did not want electronic gift card incentive	6
HIV-positive (self-report)	4

Table 2.

Descriptive statistics of the overall sample as well as the bivariate associations of HIV self-testing participation.

	HIV self-test			
	No (N = 507)	Yes (N = 253)	Total (N = 760)	*P*-Value
Age at time of enrollment in the MyPEEPS Mobile Trial				
Mean (SD)	16.13 (1.40)	16.35 (1.28)	16.21 (1.36)	0.038**
Days since enrollment in the MyPEEPS Mobile Trial				
Mean (SD)	431.20 (209.44)	415.19 (200.99)	424.91 (206.15)	0.34
Gender				
Genderqueer	004 (00.79%)	002 (00.79%)	006 (00.79%)	0.9
Male	490 (96.65%)	246 (97.23%)	736 (96.84%)	
Non-binary	010 (01.97%)	003 (01.19%)	013 (01.71%)	
Unknown	003 (00.59%)	002 (00.79%)	005 (00.66%)	
Sexuality				
Bisexual	098 (19.37%)	063 (24.90%)	161 (21.21%)	0.005**
Mostly gay/ homosexual	129 (25.49%)	037 (14.62%)	166 (21.87%)	
Only gay/ homosexual	261 (51.58%)	145 (57.31%)	406 (53.49%)	
Other	018 (03.56%)	008 (03.16%)	026 (03.43%)	
Primary Language				
English	412 (81.42%)	184 (72.73%)	596 (78.52%)	0.018**
Spanish	065 (12.85%)	051 (20.16%)	116 (15.28%)	
Other	029 (05.73%)	018 (07.11%)	047 (06.19%)	
Past HIV Test				
No	333 (65.68%)	175 (69.17%)	508 (66.84%)	0.34
Yes	174 (34.32%)	078 (30.83%)	252 (33.16%)	
Age 17 or older				
No	277 (54.64%)	126 (49.80%)	403 (53.03%)	0.21
Yes	230 (45.36%)	127 (50.20%)	357 (46.97%)	
History of condomless anal sex				
No	397 (78.30%)	189 (74.70%)	586 (77.11%)	0.27
Yes	110 (21.70%)	064 (25.30%)	174 (22.89%)	
Primary Care Provider				
NO	137 (27.02%)	069 (27.27%)	206 (27.11%)	0.08
Yes	360 (71.01%)	184 (72.73%)	544 (71.58%)	
Unknown	010 (01.97%)	000 (00.00%)	010 (01.32%)	
Sexual Attraction				
Equally attracted to males and females	057 (11.24%)	032 (12.65%)	089 (11.71%)	0.35
Mostly attracted to females	008 (01.58%)	008 (03.16%)	016 (02.11%)	
Mostly attracted to males	181 (35.70%)	076 (30.04%)	257 (33.82%)	
Only attracted to females	001 (00.20%)	000 (00.00%)	001 (00.13%)	

	HIV self-test			
	No (N = 507)	Yes (N = 253)	Total (N = 760)	*P*-Value
Only attracted to males	248 (48.92%)	135 (53.36%)	383 (50.39%)	
Only or mostly attracted to non-binary/gender non-other	003 (00.59%)	001 (00.40%)	004 (00.53%)	
	008 (01.58%)	001 (00.40%)	009 (01.18%)	
unknown	001 (00.20%)	000 (00.00%)	001 (00.13%)	
Mother Education				
Did not finish high school	062 (12.23%)	035 (13.83%)	097 (12.76%)	0.09
Earned an advanced graduate degree	072 (14.20%)	037 (14.62%)	109 (14.34%)	
Graduated from a 4-year college	112 (22.09%)	070 (27.67%)	182 (23.95%)	
Graduated from high school or GED	091 (17.95%)	045 (17.79%)	136 (17.89%)	
Had some college or technical training after high	119 (23.47%)	055 (21.74%)	174 (22.89%)	
unknown	051 (10.06%)	011 (04.35%)	062 (08.16%)	
Father Education				
Did not finish high school	060 (11.83%)	041 (16.21%)	101 (13.29%)	0.006**
Graduated from a 4-year college or above	143 (28.21%)	077 (30.43%)	220 (28.95%)	
Graduated from high school or GED	114 (22.49%)	040 (15.81%)	154 (20.26%)	
Had some college or technical training after high	082 (16.17%)	058 (22.92%)	140 (18.42%)	
unknown	108 (21.30%)	037 (14.62%)	145 (19.08%)	
Food Insecurity				
Almost every month	015 (02.96%)	002 (00.79%)	017 (02.24%)	0.25
Did not have to skip or cut the size of meals	434 (85.60%)	228 (90.12%)	662 (87.11%)	
Only 1–2 months	033 (06.51%)	013 (05.14%)	046 (06.05%)	
Some months but not every month	024 (04.73%)	010 (03.95%)	034 (04.47%)	
unknown	001 (00.20%)	000 (00.00%)	001 (00.13%)	

Note:

* P value less than 0.05

* P value less than 0.01

* P value less than 0.001