

Association of anticipated stigma and provider mistrust
on preference for HIV self-testing among MSM in the Philippines

By
Olivia T. Sison
MSPH, University of the Philippines Manila, 2008

Thesis

Submitted in partial fulfillment of the requirements for the
Degree of Master of Science in the Department of Epidemiology
at Brown University School of Public Health

PROVIDENCE, RHODE ISLAND

MAY 2021

AUTHORIZATION TO LEND AND REPRODUCE THE THESIS

As the sole author of this thesis, I authorize Brown University to lend it to other institutions or individuals for the purpose of scholarly research.

Date 02/23/2021



Olivia T. Sison, Author

I further authorize Brown University to reproduce this thesis by photocopying or other means, in total or in part, at the request of other institutions or individuals for the purpose of scholarly research.

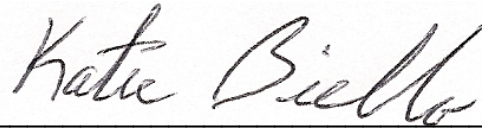
Date 02/23/2021



Olivia T. Sison, Author

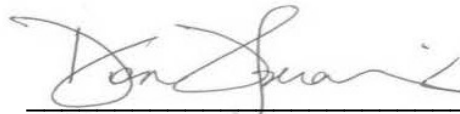
This thesis by Olivia Sison is accepted in its present form by the
Department of Epidemiology as satisfying the thesis requirements
for the degree of Master of Science in Epidemiology

Date 02/23/2021



Katie B. Biello, PhD, Thesis Advisor

Date 02/24/2021



Don Operario, PhD, Reader

Date 3/4/2021



Tongzhang Zheng, MB, ScD, ScM, PhM
Master's Program Director

Approved by the Graduate Council

Date _____

Andrew G. Campbell, Dean of the Graduate School

Preface and acknowledgements

I would like to thank Dr. Katie Biello and Dr. Don Operario for their mentorship and for their insightful contributions to this work. I would like to acknowledge Dr. Chanelle Howe for serving as my academic advisor. Additionally, I would like to acknowledge the members of the Philippine Health Initiative for Research, Service, and Training (PHIRST) for all the support they have provided. Finally, I would like to thank my family and friends for their unending support and encouragement that allowed me to finish this endeavor.

Table of Contents

Title page.....	i
Authorization to lend and reproduce the thesis	ii
Signature page	iii
Preface and acknowledgements	iv
List of tables.....	vi
List of illustrations.....	vii
Abstract.....	I
Introduction.....	2
Methods.....	4
<i>Study design and setting</i>	4
<i>Procedures</i>	4
<i>Study variables</i>	5
<i>Data Analysis</i>	7
Results.....	8
Discussion	11
Conclusion	15
Tables	16
Supplemental materials	23
References	33

List of tables

Table 1. Profile of Filipino MSM survey participants (n = 899)	16
Table 2. Level of agreement on anticipated stigma and provider mistrust among Filipino MSM (n = 899)	17
Table 3. Crude associations between covariates and preference for HIVST among Filipino MSM	18
Table 4. Adjusted associations of provider mistrust and anticipated stigma with preference to HIV self-testing among Filipino MSM	19
Table 5. Interaction between anticipated stigma and provider mistrust on preference for HIV self-testing among Filipino MSM	20
Table 6. Modification of the association of anticipated stigma on preference for HIV self-testing by disclosure of sexual orientation among Filipino MSM	21
Table 7. Modification of the association of provider mistrust on preference for HIV self-testing by disclosure of sexual orientation among Filipino MSM	22
Supplemental Table 1. Level of agreement on anticipated stigma and provider mistrust by HIV status among Filipino MSM	24
Supplemental Table 2. Crude associations between covariates and preference for HIVST among Filipino MSM	25
Supplemental Table 3. Adjusted associations of provider mistrust and anticipated stigma with preference to HIV self-testing among Filipino MSM	26
Supplemental Table 4. Interaction between anticipated stigma and provider mistrust on preference for HIV self-testing among Filipino MSM	27
Supplemental Table 5. Modification of the association of anticipated stigma on preference for HIV self-testing by disclosure of sexual orientation among Filipino MSM	28
Supplemental Table 6. Modification of the association of provider mistrust on preference for HIV self-testing by disclosure of sexual orientation among Filipino MSM	29
Supplemental Table 7. Crude associations between covariates and preference for HIVST among Filipino MSM	30
Supplemental Table 8. Adjusted associations of provider mistrust and anticipated stigma with preference to HIV self-testing among Filipino MSM	31
Supplemental Table 9. Modification of the association of anticipated stigma and provider mistrust on preference for HIV self-testing by disclosure of sexual orientation among Filipino MSM	32

List of illustrations

Figure S1. Directed Acyclic Graph of the association between anticipated stigma and HIVST preference	23
Figure S2. Directed Acyclic Graph of the association between provider mistrust and HIVST preference	23
Figure S3. Directed Acyclic Graph of the interaction of anticipated stigma and provider mistrust in relation to HIVST preference.....	23

Abstract

Background. The rate of increase in new HIV infections in the Philippines has been exceptional; on average 36 new HIV cases per day were diagnosed in 2019 compared to only 7 cases per day in 2011. HIV testing uptake among key populations in the Philippines is generally low; approximately one-quarter of MSM have ever been tested for HIV. HIV self-testing (HIVST) may increase overall testing rates by removing some barriers, including stigma and provider mistrust. This study aimed to determine if anticipated stigma and provider mistrust were associated with HIVST preference among Filipino MSM, and whether there is an interaction between anticipated stigma and provider mistrust on their effects on HIVST preference.

Methods. An online survey was administered to customers of a bar and was also advertised through MSM dating sites. Summary statistics were computed to describe the characteristics of the participants. Multivariable Poisson regression analyses were conducted to determine if anticipated stigma and provider mistrust were associated with HIVST preference among MSM.

Results. A total of 899 MSM participated in the survey with an average age of 28.7 years ($SD=7.9$); most had received college degrees (73%) and were employed (80%). The majority of all respondents (81%) preferred facility-based testing while 18% preferred HIVST. There was a high level of anticipated stigma (67%) and provider mistrust (44%) in this population. Anticipated stigma was related to a 61% increase in the prevalence of HIVST preference ($aPR=1.61$; 95% CI = 1.09 – 2.39, $p=0.018$), and provider mistrust was associated with a 50% increase in the prevalence of HIVST preference ($aPR=1.50$; 95% CI = 1.08 – 2.07, $p=0.014$). There was a significant positive interaction on the additive scale between provider mistrust and anticipated stigma on HIVST preference ($RERI = 1.09$, 95% CI: 0.16 – 2.03; $p=0.022$).

Conclusions. HIVST should be offered as a supplementary to the traditional facility-based HIV testing services in the Philippines in order to expand testing and reach individuals who may not undergo testing due to anticipated stigma and provider mistrust.

Keywords: HIV self-testing, Men who have sex with men (MSM), Philippines, anticipated stigma, provider mistrust

Introduction

The rate of increase in new HIV infections in the Philippines has been exceptional (1); on average 36 new HIV cases per day were seen in 2019 compared to only 7 cases per day in 2011 (2). Eighty three percent of all diagnosed HIV cases in the Philippines from 2014 - 2019 were among men who have sex with men (MSM), and among these, the majority were young people (2). The HIV prevention continuum highlights the importance of HIV testing; this is an essential first step in the treatment cascade and critical to all HIV prevention and treatment strategies.

Facility-based testing is the main model of HIV testing in the Philippines, with testing being voluntary and requiring informed consent. According to the Philippines Department of Health Integrated HIV Behavioral and Serologic Surveillance data, HIV testing uptake among key populations in the Philippines is generally low with around 27% to 36% having ever been tested for HIV; only 28% HIV testing was noted among MSM (3,4). Several studies in Europe, US, South Africa, and the Philippines reported that low HIV testing uptake is associated with: sociodemographic factors such as younger age, lower education level, and higher socioeconomic status; lack of accessibility to services; lack of awareness of HIV testing and counseling; number of sexual partners; health care provider factors (e.g. onward referral due to avoidance of the issue of HIV testing); unfriendly testing environments; and psychosocial factors such as fear of rejection and disclosure, and HIV-related stigma and discrimination (5–10).

To achieve the United Nations 90-90-90 global HIV targets, where the first 90 corresponds to diagnose 90% of all people living with HIV, the World Health Organization (WHO) launched a set of consolidated guidelines in 2016 about HIV testing services (11). The guidelines emphasize the potential of HIV self-testing (HIVST) as an additional approach to increase HIV testing coverage, especially among MSM and other key populations (12). Previous

studies in Australia, US, Africa, and Hong Kong have shown that HIVST was generally acceptable among MSM, and it increased HIV testing coverage because of its convenience while ensuring confidentiality and privacy (13,14). In the Philippines, there is no current policy about HIVST, but a recent qualitative study found that HIVST was highly acceptable to MSM and transgender women (TGW) as an additional approach to existing HIV testing services (15).

Among MSM, experiencing stigma related to their sexual orientation, anticipated stigma, and medical mistrust has been shown to be associated with lower engagement in care or underutilization of health services (16,17). Those who are unwilling to access existing care due to structural barriers such as these had higher intention to use HIVST (18). Anticipated stigma and medical mistrust independently yield negative consequences, yet the additive effects of experiencing both anticipated stigma and provider mistrust, as well as the added effect of sexual orientation disclosure have received limited research attention and deserves attention.

To date, there is a paucity of data in the Philippines on what fraction of MSM would prefer HIVST and whether anticipated stigma and provider mistrust would drive their preference for HIVST. This study aimed to determine if anticipated stigma and provider mistrust were associated with HIVST preference among Filipino MSM, and whether there is an interaction between anticipated stigma and provider mistrust on their effects on HIVST preference. In addition, we examined whether the association of anticipate stigma and HIVST preference, and provider mistrust and HIVST preference were modified by disclosure of sexual orientation among this population.

Findings of this research will provide information on the magnitude of the potential reach of HIVST among the high-risk group of MSM who may not otherwise undergo testing due to anticipated stigma and provider mistrust. If the Philippines opts to include HIVST as an HIV testing

strategy, it is important to determine factors associated with preference for HIVST, so that policy, programmatic, and operational planning can be streamlined to widen the reach of this strategy.

Methods

Study design and setting

This study entailed a secondary analysis of data from the HIV Gaming, Engaging, and Testing (HIV GET) Project, whose main aim was to develop and evaluate a mobile game application to address identified barriers to HIV services (19). The original study was a cross-sectional survey conducted in 2016 and was approved by the University of the Philippines Manila Research Ethics Board. Convenience sampling and active recruitment via MSM dating sites (e.g., Grindr, Planet Romeo, and GROWLR) were used to recruit study participants. The survey was administered to customers of a bar in Quezon City, Philippines using a mobile tablet, and to users of MSM dating sites using an online survey. Study participants were eligible if they were at least 18 years old, self-identified as MSM, and were able to give informed consent. Although respondents who self-reported to be HIV-positive will not need to obtain HIV testing, they were included in the analytic sample given that their testing preference may also influence the testing preference of their social network and sexual partners. A total of 899 MSM completed the survey between October and November 2016.

Procedures

An online survey was developed for the HIV GET project and was administered to customers in a bar using a mobile tablet. The survey was also advertised in MSM dating sites where a message box was displayed in these sites and encouraged the user to take an online survey being conducted by the University of the Philippines Manila and Liverpool School of

Tropical Medicine to improve the HIV/AIDS testing and counseling in the Philippines. Those who clicked the advertisement on these sites were redirected to the informed consent page. Screening questions were used to identify eligible participants, and those who were eligible were redirected to the main survey questionnaire page. Survey questions were in English and Tagalog. Survey participants were not compensated in this study.

Study variables

Preferred HIV testing method

The main outcome of interest in this study is the preferred HIV testing method. Participants were asked which of the following is their preferred HIV testing method: (1) hospital-based testing (*pagpapa-test sa ospital*), (2) clinic-based testing (*pagpapa-test sa klinika [social hygiene clinics]*), (3) home-based testing with a health worker (*pagpapa-test sa bahay sa tulong ng health care worker*), (4) community-based testing with a health worker (*pagpapa-test sa isang outreach activity or komunidad sa tulong ng health care worker*), and (5) self-testing (*pagte-test sa sarili*). Preferred HIV testing method was coded as a binary variable (1 = HIV self-testing; 0 = facility-based testing or home/community-based testing with a health worker).

Anticipated HIV testing stigma and provider mistrust

The main exposure variables were anticipated HIV testing stigma and provider mistrust. Anticipated stigma was assessed using the respondents' level of agreement to the following statements: (1) *I feel like I would be stigmatized going to an HIV/AIDS testing facility*, (2) *I worry about being recognized at the HIV/AIDS testing facility*, (3) *I feel like the staff would disrespect me*. Provider mistrust was assessed using the respondents' level of agreement to the following statements: (1) *I don't think there will be anyone in the HIV/AIDS testing facility that I can trust to talk to*, (2) *I don't trust the counselors at the HIV/AIDS testing facility*, (3) *I don't trust the people that take your blood at*

the HIV/AIDS testing facility, (4) I don't trust the results you get at the HIV/AIDS testing facility. The level of agreement for the statements were measured using a 7-point Likert scale (strongly disagree, disagree, somewhat disagree, neutral, somewhat agree, agree, and strongly agree). If the respondent agreed or strongly agreed to at least one of the statements indicative of anticipated stigma, he was considered to have anticipated stigma (1 = yes, 0 = no). If the respondent agreed or strongly agreed to at least one of the statements indicative of medical mistrust, he was considered to have medical mistrust (1 = yes, 0 = no).

Directed acyclic graphs (DAG) were constructed to determine the minimum set of covariates to adjust for in the analysis of the association between anticipated stigma and HIVST preference, and provider mistrust and HIVST preference (See Supplemental figures) using DAGitty version 3.0 (20). All variables included in the DAG were chosen based on prior knowledge and literature review. For this study, the minimal sufficient adjustment set includes age, level of education, monthly income, relationship status, HIV serostatus, and knowing where to get HIV testing.

The respondent's age in years was categorized as follows: 18 – 24, 25 – 34, ≥35. Educational attainment was coded as a binary variable (1 = graduated from college or higher, 0 = college level and below). Monthly income was categorized as 10,000 pesos and below (≤USD 207) or more than 10,000 pesos (≥USD 207) and this was based on defined poverty threshold (21). Participant's relationship status was classified as follows: single, not looking for a relationship; single, looking only for serious relationship; single, looking only for casual relationships; in a relationship, exclusive; and in a relationship, open. Participants were also asked of their HIV status and this was coded as follows: 0 = HIV negative, 1 = HIV positive, 2 = unsure, 9 = refused to

answer. They were also asked if they know where to get HIV testing and this was coded as a binary variable. Survey respondents were asked about their sexual orientation with the following response options: (1) heterosexual, (2) gay/homosexual (prefers sexual activities with same sex), (3) bisexual (prefers sexual activities with both sexes), (4) discreet (do not openly disclose sexual activities), (5) not in any category; this was further classified as a binary variable whether participants are open to disclose their sexual orientation in the context of the survey or not (1 = do not openly disclose sexual orientation, 0 = open to disclose sexual orientation), and disclosure of sexual orientation was considered as an effect modifier. Disclosure of sexual orientation in the context of the survey was used as a proxy for broader disclosure.

Data Analysis

To describe the characteristics of participants, frequencies and percentages were calculated for categorical variables while mean, standard deviation, and range were calculated for continuous variables. Separate bivariable Poisson regressions were performed to estimate the prevalence ratios for the association between HIVST preference and the following covariates: age, disclosure of sexual orientation, relationship status, level of education, employment status, monthly income, knowing where to get HIV testing, recent HIV test, HIV serostatus, anticipated stigma, and provider mistrust. Multivariable Poisson regression analyses (with robust variance estimator) were performed to estimate prevalence ratios for the association of exposure variables and HIVST, adjusting for the covariates described previously. We used Poisson regression with robust variance because it results in more valid estimates of associations compared to logistic regression in cross-sectional studies with outcomes that are not rare (22). Separate generalized linear models with Poisson distribution and log link were constructed with anticipated stigma and provider mistrust as exposure variables in the two models (Models I and

2). Age, level of education, monthly income, relationship status, self-reported HIV serostatus, and knowing where to get HIV testing were the minimal sufficient adjustment set in the analyses. A third model was constructed to assess the interaction of anticipated stigma and provider mistrust and its effect on HIVST preference. Two separate models were also created to assess whether disclosure of sexual orientation modifies the effect of anticipated stigma on HIVST preference, and provider mistrust on HIVST preference. Interaction (Model 3) and effect measure modification (Models 4 and 5) were assessed by including an interaction term in the multivariable Poisson regression models. The interaction between anticipated stigma and provider mistrust was determined by estimating the relative excess risk due to interaction (RERI), following the method outlined by VanderWeele (23). A RERI of greater than zero means that there is a positive interaction between anticipated stigma and provider mistrust on their effects to HIVST preference. Positive interaction in this study would imply that consequences of public health intervention addressing anticipated stigma would be greater among those who have provider mistrust compared to those who trust the health care providers in the testing facilities.

Adjusted prevalence ratios (aPR) and their 95% confidence intervals relating the exposure variables and HIVST preference were presented. All data management and statistical analyses were performed using Stata version 16 (24).

Results

A total of 899 MSM participated in the survey and were included in the final analytic sample of this study. Table 1 summarizes the overall sample characteristics of the participants. In brief, survey participants were between 18 and 61 years old with an average age of 28.7 years (SD=7.9), mostly with college degrees (73%), and employed (80%). Majority identified to be

gay/homosexual, and more than a quarter identified as bisexual, while 17% did not want to disclose their sexual orientation. Almost one-fifth were in an exclusive relationship and the rest were single at the time of the survey. One-third were unsure of their HIV status, and 9% (N=84) self-reported to be HIV-positive. Almost half (45%) of the respondents had undergone HIV testing in the past 12 months. However, 33% (N=300) had never been tested for HIV, although 72% of all participants knew where to get HIV testing. Almost 2 out of 10 preferred HIV self-testing while 69% selected hospital or clinic-based HIV testing, and 12% preferred home or community-based testing with the help of health care worker.

Table 2 presents the level of agreement of participants to measurement items for anticipated stigma and provider mistrust. Overall, 67% (N=584) agreed to any statement pertaining to anticipated stigma, while 44% (N=382) reported mistrust of health care providers in the testing facilities.

Tables 3 and 4 present bivariable associations between covariates and HIVST preference, and adjusted associations of anticipated stigma and provider mistrust with HIVST preference. The following covariates were associated with HIVST preference: age, disclosure of sexual orientation, HIV status, knowing where to get HIV testing, and having a recent HIV test. The prevalence of HIVST preference increased by 70% among those who did not want to disclose their sexual orientation compared to those who were willing to disclose their sexual orientation (PR=1.7, 95%CI: 1.3 – 2.3, $p=0.001$).

Both anticipated stigma and provider mistrust were strongly associated with participant's preference to HIVST. Individuals reporting anticipated stigma and provider mistrust had a significantly higher prevalence of choosing HIVST over the other HIV testing methods. In adjusted analyses, anticipated stigma was associated with a 61% increase in the prevalence of HIVST

preference (aPR=1.61; 95% CI = 1.09 – 2.39, $p=0.018$), and provider mistrust was associated with a 50% increase in the prevalence of HIVST preference (aPR=1.50; 95% CI = 1.08 – 2.07, $p=0.014$).

Table 5 summarizes the results of the multivariable regression within combined stratum of anticipated stigma and provider mistrust. After adjusting for all covariates, provider mistrust was positively associated with HIVST preference (aPR=1.44; 95%CI=0.96 – 2.15, $p=0.075$) among those with anticipated stigma and anticipated stigma was also positively associated with HIVST preference among respondents who reported to have provider mistrust (aPR=3.99; 95%CI=0.70 – 22.79, $p=0.120$); though the associations were not significant at $p<0.05$.

There was a significant positive interaction on the additive scale between provider mistrust and anticipated stigma on HIVST preference (RERI = 1.09, 95% CI: 0.16 – 2.03; $p=0.022$), indicating that the effect of anticipated stigma on HIVST preference is greater among those who had provider mistrust compared to those who trust health care workers in the testing facilities.

Table 6 presents the results of the association of anticipated stigma on HIVST preference as modified by disclosure of sexual orientation. Anticipated stigma was associated with a 60% increase in the prevalence of HIVST preference (aPR=1.60; 95% CI = 1.03 – 2.47, $p=0.036$) among those who were willing to disclose their sexual orientation, while anticipated stigma was associated with a 118% increase in the prevalence of HIVST preference (aPR=2.18; 95% CI = 1.31 – 3.62, $p=0.003$) among those who did not want to disclose their sexual orientation. There was no effect modification of anticipated stigma by disclosure of sexual orientation on the additive scale (RERI=0.20; 95% CI = -1.21 – 1.60, $p=0.784$).

Provider mistrust was associated with a 116% increase in the prevalence of HIVST preference (aPR=2.16; 95% CI = 1.40 – 3.33, $p=0.001$) among those who did not want to disclose their sexual orientation. There was no effect modification of provider mistrust across strata of

disclosure of sexual orientation on the additive scale (RERI=0.42; 95% CI = -0.71 – 1.54, $p=0.465$) (Table 7).

Sensitivity analyses excluding respondents who self-reported to be HIV-positive ($n=84$) were done to assess the robustness of the results. Prevalence of primary measures, associations in bivariable and multivariable regression analyses, and interaction and effect modification analyses were all consistent with the previous results. (Supplemental Tables 1 – 6). Additional sensitivity analyses using the average scores of anticipated stigma and provider mistrust items were performed. Associations in bivariable and multivariable regression analyses were all consistent with the previous results. However, there was no interaction detected between provider mistrust and anticipated stigma on HIVST preference, and no effect modification of anticipated stigma and provider mistrust across strata of disclosure of sexual orientation (Supplemental Tables 7 – 9).

Discussion

This study documented the percentage of MSM recruited from social venues and MSM dating sites in Manila, Philippines who prefer HIVST and assessed the independent associations between both anticipated stigma and provider mistrust and HIVST preference. In addition, this study examined whether anticipated stigma and provider mistrust interact in their effects on HIVST preference. This is the first quantitative assessment of HIVST preference among MSM in the Philippines who comprised more than 80% of all diagnosed HIV cases in the country (2).

Over 60% of survey participants had ever been tested for HIV of which 45% were tested in the past 12 months. This percentage was higher than the reported estimate that only 22% of Filipino MSM had ever been tested for HIV (3). It is possible that because survey respondents were recruited in social venues where HIV prevention and testing messages are existing, this

population were more likely to have been tested for HIV. This shows that the sample population in this study was generally engaged in HIV testing services which could potentially influence their HIVST preference.

Almost one-fifth of the survey participants preferred HIVST; they tended to be older, who did not want to disclose their sexual orientation in the context of the survey, were unsure of their HIV status, did not know where to get HIV testing, and had never been tested for HIV nor were currently engaged in routine testing. The percentage of those who prefer HIVST was lower than expected given that from previous studies, in which it has been suggested that HIVST was highly acceptable to target users including MSM (15,18,25–28). One possible reason for suboptimal number who preferred HIVST in this group is the moderate level of awareness about HIVST – given previous research reporting that only 56% of MSM in the Philippines had heard about HIVST (29). Also, HIVST is still not included in the national policies and guidelines in the Philippines and self-test kits with WHO prequalification are still unavailable. Additionally, a considerable proportion of survey participants were currently undergoing routine testing and those receiving free services for testing are unlikely to choose HIVST (30).

In this study, more than half of the participants prefer a facility-based HIV testing strategy. Similar studies in the UK and Ireland conducted after the timing of our survey also found that MSM still prefer facility-based HIV testing (31,32). While the majority of MSM in our sample preferred the traditional HIV testing services, we cannot discount the fact that 18% of MSM in this study population preferred HIVST and we need to ensure that their testing needs are met. Preference for HIVST in this population is likely to increase as awareness and trust for this testing modality grows. Thus, a mixed landscape of HIV testing services can expand opportunities for service delivery in the country; HIVST can be a supplementary to facility-based testing rather than

needing to replace traditional HIV testing services (30). Traditional HIV testing and HIVST may co-exist in the HIV testing services framework (33), and based on previous studies and a meta-analysis conducted in 2017, HIVST significantly increased HIV testing uptake compared to the traditional testing strategy (14,34).

A significant percentage of the study participants reported anticipated stigma and mistrust of health care providers in the testing facilities. Both anticipated stigma and provider mistrust were found to be associated with HIVST preference. This is consistent with previous studies that anticipated stigma and physician mistrust were found to be associated with HIV testing behavior and utilization of health services among MSM (10,35–39). Provider mistrust and stigma are important risk factors for health outcomes because these factors might influence healthcare utilization and thus affect the overall health among the high-risk groups. In a global systematic review including 18 studies, it was reported that HIVST was preferred due to increased convenience and confidentiality especially among stigmatized populations, and HIVST decreased test-associated stigma (40). In this study, HIVST preference increased among those who did not want to disclose their sexual orientation, and this was found to interact with their level of anticipated stigma. This presents an opportunity to engage those individuals in care who felt stigmatized and were not open about their sexual orientation by providing HIVST as an option for HIV testing services. These findings suggest that aside from HIVST provision to high-risk groups, efforts to rebuild the trust of the healthcare providers and address sources of stigma can be a promising approach to improve HIV testing uptake and ultimately engage everyone in the healthcare services in the country. In 2012, a “sundown clinic” was established in Quezon City, Metro Manila and it was considered non-stigmatizing and a safe space for MSM and transgender people providing HIV testing and counseling services and operates until 11 pm to capture working

individuals (41). Future efforts to scale-up this initiative to different areas in the country is much needed.

Findings of this study must be interpreted with caution given the limitations of the study. The majority of the participants were between 18 to 34 years old and were highly educated and employed; these group of people may have higher access to social network groups and dating mobile applications, and hence were reached by this study. This sample population may not constitute the attributes of the MSM in the general population but may provide insights among the young people who comprised majority of incident cases among MSM. Participants in this study were invited through convenience sampling methods, such as recruiting in a gay bar and via social advertisements and MSM dating applications. Sexual behaviors were not measured in this study and ascertaining whether participants are at high risk of HIV infection was not possible. Thus, findings are not generalizable to all MSM in the Philippines who are at high risk of HIV infection. This study used self-reported measures of recent HIV testing and HIV status, and anticipated stigma and provider mistrust were assessed by their level of agreement to statements rather than their actual experience of stigma and discrimination. As noted, participants might have lacked basic awareness and understanding of HIVST, thereby contributing to higher preference for traditional HIV testing methods. Social desirability may lead to overreporting of recent HIV testing and underreporting of HIV serostatus. Residual confounding may have been introduced due to possible unmeasured confounders, such as health service delivery and health provider factors that were not assessed in this study. Furthermore, due to the cross-sectional nature of the study, findings are descriptive and precludes temporal or causal inferences.

Conclusion

This descriptive study among MSM in the Philippines suggests that one out of five MSM preferred HIVST over the traditional HIV testing strategies. Increase in preference for HIVST may increase with expanded campaigns to raise awareness, understanding, and access to HIVST methods. There is a high level of anticipated stigma and reported mistrust of health care providers in the testing facilities. Both anticipated stigma and provider mistrust were found to be associated with an increase in the prevalence of HIVST preference. HIVST should be offered as a supplementary to the traditional HIV testing services in the Philippines in order to expand testing and reach individuals who may not undergo testing due to anticipated stigma and provider mistrust.

Abbreviations

AIDS: Acquired immunodeficiency syndrome; DAG: Directed acyclic graph; HIV: Human immunodeficiency virus; HIV GET: HIV Gaming, Engaging, and Testing; HIVST: HIV self-testing; MSM: Men who have sex with men; TGW: Transgender women; WHO: World Health Organization

Table 1. Profile of Filipino MSM survey participants (n = 899)

	Frequency	%
Age (years)		
Mean (SD)		28.7 (7.9)
Range		18 – 61
18 – 24	300	33.4
25 – 34	424	47.2
≥ 35	166	18.5
Sexual orientation		
Heterosexual	35	3.9
Gay/homosexual	456	50.7
Bisexual	246	27.4
Do not openly disclose	148	16.5
Do not place self in any sexual category	14	1.6
Relationship status		
Single, not looking for a relationship	183	20.4
Single, looking only for serious relationship	323	35.9
Single, looking only for casual relationship	116	12.9
In a relationship, exclusive	174	19.4
In a relationship, open	103	11.5
Education		
College undergraduate & below	207	23.0
At least college graduate	656	73.0
Employment status		
Unemployed	118	13.1
Employed	722	80.3
Do not want to disclose	59	6.6
Monthly income (Philippine peso)		
10K & below	169	18.8
Above 10K	589	65.5
Recent HIV test		
Past 12 months	406	45.2
Never been tested	300	33.4
More than a year ago	193	21.5
HIV status		
HIV negative	467	52.0
HIV positive	84	9.3
Unsure	293	32.6
Do not want to disclose	55	6.1
Know where to get tested		
Yes	649	72.2
No	250	27.8
Preferred HIV testing method		
Hospital/Clinic/Home or Community-based with a health care worker	732	81.4
Self-testing	167	18.6

Table 2. Level of agreement on anticipated stigma and provider mistrust among Filipino MSM

	Frequency	%
Anticipated stigma^a	584	66.6
I feel like I would be stigmatized going to an HIV/AIDS testing facility	478	54.5
I worry about being recognized at the HIV/AIDS testing facility	472	53.8
I feel like the staff would disrespect me	280	31.9
Provider mistrust^b	382	44.2
I don't think there will be anyone in the HIV/AIDS testing facility that I can trust to talk to	299	34.6
I don't trust the counselors at the HIV/AIDS testing facility	213	24.6
I don't trust the people that take your blood at the HIV/AIDS testing facility	210	24.3
I don't trust the results you get at the HIV/AIDS testing facility	163	18.8

^a If the participant agreed to at least one question on anticipated stigma questions, the person was considered with anticipated stigma (n=877)

^b If the participant agreed to at least one question on provider mistrust questions, the person was considered with provider mistrust (n=865)

Table 3. Crude associations between covariates and preference for HIVST among Filipino MSM^a

Characteristic	Total <i>n</i>	HIVST		Facility/community-based testing		Crude PR (95% CI)
		<i>n</i>	%	<i>n</i>	%	
		167	18.6	732	81.4	
Age						
18 – 24	300	36	12.0	264	88.0	1.0
25 – 34	424	89	21.0	335	79.0	1.7 (1.2 – 2.5)*
≥ 35	166	42	25.3	124	74.7	2.1 (1.4 – 3.2)**
Disclosure of sexual orientation						
Yes	751	125	16.6	626	83.4	1.0
No	148	42	28.4	106	71.6	1.7 (1.3 – 2.3)*
Relationship status						
Single, not looking for a relationship	183	22	12.0	161	88.0	1.0
Single, looking only for serious relationship	323	71	22.0	252	78.0	1.8 (1.2 – 2.8)*
Single, looking only for casual relationship	116	31	26.7	85	73.3	2.2 (1.4 – 3.6)*
In a relationship, exclusive	174	22	12.6	152	87.4	1.1 (0.6 – 1.8)
In a relationship, open	103	21	20.4	82	79.6	1.7 (1.0 – 2.9)*
Education						
College undergraduate & below	207	29	14.0	178	86.0	1.0
At least college graduate	656	127	19.4	529	80.6	1.4 (1.0 – 2.0)*
Employment status ^a						
Unemployed	118	19	16.1	99	83.9	1.0
Employed	722	136	18.8	586	81.2	1.2 (0.8 – 1.8)
Monthly income (Philippine peso)						
10K & below	169	25	14.8	144	85.2	1.0
Above 10K	589	116	19.7	473	80.3	1.3 (0.9 – 2.0)
Know where to get tested						
Yes	649	99	15.3	550	84.8	1.0
No	250	68	27.2	182	72.8	1.8 (1.4 – 2.3)**
Recent HIV test						
Past 12 months	406	42	10.3	364	89.7	1.0
Never tested	300	82	27.3	218	72.7	2.6 (1.9 – 3.7)**
> 1 year ago	193	43	22.3	150	77.7	2.2 (1.5 – 3.2)**
HIV status						
Negative	467	65	13.9	402	86.1	1.0
Positive	84	11	13.1	73	86.9	0.9 (0.5 – 1.7)
Unsure	293	79	27.0	214	73.0	1.9 (1.4 – 2.6)**
Anticipated stigma						
No	293	39	13.3	254	86.7	1.0
Yes	584	124	21.2	460	78.8	1.6 (1.1 – 2.2)*
Provider mistrust						
No	483	70	14.5	413	85.5	1.0
Yes	382	87	22.8	296	77.2	1.6 (1.2 – 2.1)*

^a Numbers may not sum to the total sample size due to missing data.

CI: confidence interval; PR: Prevalence Ratio; HIVST: HIV self-testing.

p*<0.10; *p*<0.05; ****p*<0.001.

Table 4. Adjusted associations of provider mistrust and anticipated stigma with preference to HIV self-testing among Filipino MSM*

	aPR (95% CI)	Robust SE	p-value
Anticipated stigma	1.61 (1.09 – 2.39)	0.32	0.018
Provider mistrust	1.50 (1.08 – 2.07)	0.25	0.014

* Adjusted analyses included N=675 for stigma and N=666 for provider mistrust due to missing data for some of the covariates. PRs are adjusted for age, education, HIV status, know where to get tested, monthly income, relationship status.

aPR: adjusted Prevalence Ratio; SE: standard error.

Table 5. Interaction between anticipated stigma and provider mistrust on preference for HIV self-testing among Filipino MSM*

Provider mistrust	Anticipated stigma				PR (95% CI) for anticipated stigma within strata of provider mistrust
	n HIVST/ other testing	No PR (95% CI)	n HIVST/ other testing	Yes PR (95% CI)	
No	36/224	1.00	34/187	1.18 (0.72 – 1.95); <i>p</i> =0.506	1.18 (0.72 – 1.95); <i>p</i> =0.506
Yes	3/30	0.43 (0.07 – 2.47); <i>p</i> =0.343	81/260	1.71 (1.12 – 2.60); <i>p</i> =0.013	3.99 (0.70 – 22.79); <i>p</i> =0.120
PR (95% CI) for provider mistrust within strata of anticipated stigma		0.43 (0.07 – 2.47); <i>p</i> =0.343		1.44 (0.96 – 2.15); <i>p</i> =0.075	

Measure of interaction on additive scale: RERI (95% CI) = 1.09 (0.16 – 2.03); *p* = 0.022.

PRs are adjusted for age, education, HIV status, know where to get tested, monthly income, relationship status.

CI: confidence interval; PR: Prevalence Ratio; RERI: relative excess risk due to interaction.

* Adjusted analyses included N=659 due to missing data for some of the covariates.

Table 6. Modification of the association of anticipated stigma on preference for HIV self-testing by disclosure of sexual orientation among Filipino MSM*

Disclosure of sexual orientation	Anticipated stigma				PR (95% CI) for anticipated stigma within strata of disclosure
	n HIVST/ other testing	No PR (95% CI)	n HIVST/ other testing	Yes PR (95% CI)	
Yes	30/222	1.00	93/390	1.60 (1.03 – 2.47); <i>p</i> =0.036	1.60 (1.03 – 2.47); <i>p</i> =0.036
No	9/32	1.38 (0.56 – 3.39); <i>p</i> =0.478	31/70	2.18 (1.31 – 3.62); <i>p</i> =0.003	1.57 (0.65 – 3.81); <i>p</i> =0.315

Measure of effect modification on additive scale: RERI (95% CI) = 0.20 (-1.21 – 1.60); *p* = 0.784.

PRs are adjusted for age, education, HIV status, know where to get tested, income, relationship status.

CI: confidence interval; PR: Prevalence Ratio; RERI: relative excess risk due to interaction.

* Adjusted analyses included N=691 due to missing data for some of the covariates.

Table 7. Modification of the association of provider mistrust on preference for HIV self-testing by disclosure of sexual orientation among Filipino MSM*

Disclosure of sexual orientation	Provider mistrust				PR (95% CI) for provider mistrust within strata of disclosure
	n HIVST/ other testing	No PR (95% CI)	n HIVST/ other testing	Yes PR (95% CI)	
Yes	56/356	1.00	61/255	1.43 (0.99 – 2.06); p=0.059	1.43 (0.99 – 2.06); p=0.059
No	14/57	1.32 (0.70 – 2.47); p=0.394	26/40	2.16 (1.40 – 3.33); p=0.001	1.64 (0.83 – 3.23); p=0.151

Measure of effect modification on additive scale: RERI (95% CI) = 0.42 (-0.71 – 1.54); p = 0.465.

PRs are adjusted for age, education, HIV status, know where to get tested, income, relationship status.

CI: confidence interval; PR: Prevalence Ratio; RERI: relative excess risk due to interaction.

* Adjusted analyses included N=666 due to missing data for some of the covariates.

Supplemental materials

Figure S1. Directed Acyclic Graph of the association between anticipated stigma and HIVST preference

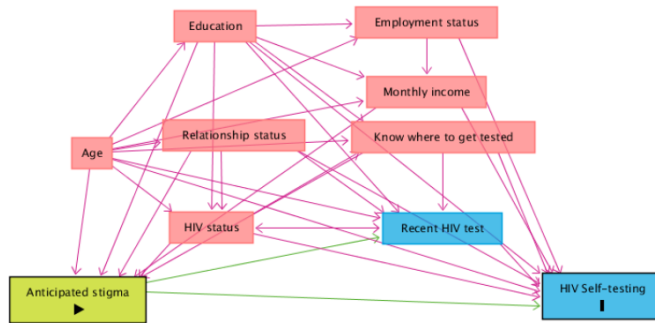


Figure S2. Directed Acyclic Graph of the association between provider mistrust and HIVST preference

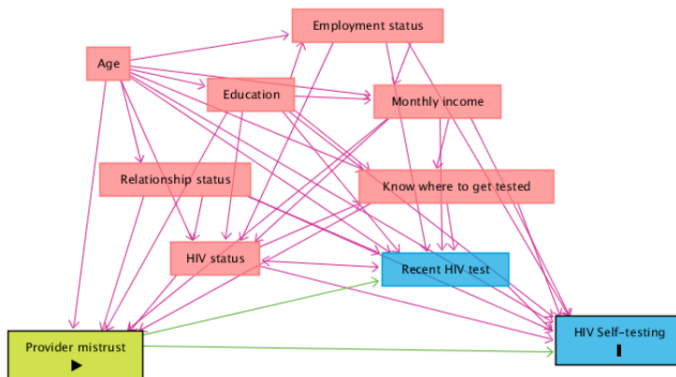
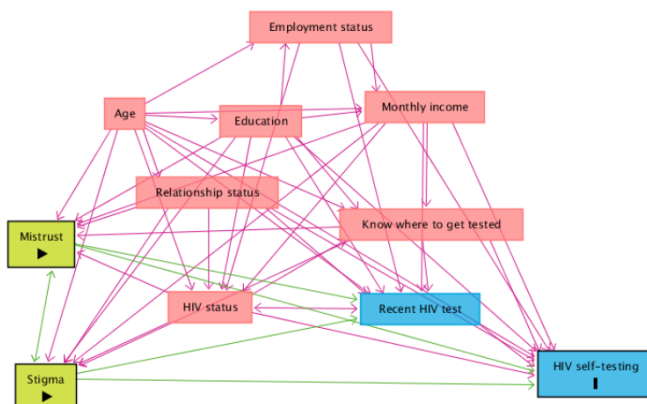


Figure S3. Directed Acyclic Graph of the interaction of anticipated stigma and provider mistrust in relation to HIVST preference



Supplemental Table 1. Level of agreement on anticipated stigma and provider mistrust by HIV status among Filipino MSM

	HIV+	Not HIV+	Total
	<i>(n = 82)</i>	<i>(n = 795)</i>	<i>(n = 877)*</i>
Anticipated stigma^a	70.7	66.2	66.6
I feel like I would be stigmatized going to an HIV/AIDS testing facility	61.0	53.8	54.5
I worry about being recognized at the HIV/AIDS testing facility	62.2	53.0	53.8
I feel like the staff would disrespect me	32.0	31.7	31.9
Provider mistrust^b	45.1	44.1	44.2
I don't think there will be anyone in the HIV/AIDS testing facility that I can trust to talk to	40.2	34.0	34.6
I don't trust the counselors at the HIV/AIDS testing facility	24.3	28.1	24.6
I don't trust the people that take your blood at the HIV/AIDS testing facility	22.0	24.5	24.3
I don't trust the results you get at the HIV/AIDS testing facility	14.6	19.3	18.8

^a If the participant agreed to at least one question on anticipated stigma questions, the person was considered with anticipated stigma

^b If the participant agreed to at least one question on provider mistrust questions, the person was considered with provider mistrust

* Total n may not sum to the group sample sizes due to missing HIV status

Supplemental Table 2. Crude associations between covariates and preference for HIVST among Filipino MSM^a

Characteristic	Total <i>n</i>	HIVST		Facility/community-based testing		Crude PR (95% CI)
		<i>n</i> 167	% 18.6	<i>n</i> 732	% 81.4	
Age						
18 – 24	283	35	12.4	248	87.6	1.0
25 – 34	375	82	21.9	293	78.1	1.8 (1.2 – 2.5)*
≥ 35	150	39	26.0	111	74.0	2.1 (1.4 – 3.2)**
Disclosure of sexual orientation						
Yes	678	117	17.3	561	82.7	1.0
No	137	39	28.5	98	71.5	1.6 (1.2 – 2.3)*
Relationship status						
Single, not looking for a relationship	163	21	12.9	142	87.1	1.0
Single, looking only for serious relationship	300	67	22.3	233	77.7	1.7 (1.1 – 2.7)*
Single, looking only for casual relationship	103	30	29.1	73	70.9	2.3 (1.4 – 3.7)*
In a relationship, exclusive	161	20	12.4	141	87.6	1.0 (0.5 – 1.7)
In a relationship, open	88	18	20.5	70	79.6	1.6 (0.9 – 2.8)
Education						
College undergraduate & below	192	28	14.6	164	85.4	1.0
At least college graduate	590	117	19.8	473	80.2	1.4 (0.9 – 2.0)
Employment status ^a						
Unemployed	108	16	14.8	92	85.2	1.0
Employed	649	128	19.7	521	80.3	1.3 (0.8 – 2.1)
Monthly income (Philippine peso)						
10K & below	157	24	15.3	133	84.7	1.0
Above 10K	524	106	20.2	418	79.8	1.3 (0.9 – 2.0)
Know where to get tested						
Yes	568	89	15.7	479	84.3	1.0
No	247	67	27.1	180	72.8	1.7 (1.3 – 2.3)**
Recent HIV test						
Past 12 months	368	36	9.8	332	90.2	1.0
Never tested	300	82	27.3	218	72.7	2.8 (1.9 – 4.0)**
> 1 year ago	147	38	25.9	109	74.2	2.6 (1.7 – 4.0)**
HIV status						
Negative	467	65	13.9	402	86.1	1.0
Unsure	293	79	27.0	214	73.0	1.9 (1.4 – 2.6)**
Anticipated stigma						
No	269	38	14.1	231	85.9	1.0
Yes	526	115	21.9	411	78.1	1.5 (1.1 – 2.2)*
Provider mistrust						
No	438	65	14.8	373	85.2	1.0
Yes	345	82	23.8	263	76.2	1.6 (1.2 – 2.1)*

^a Numbers may not sum to the total sample size due to missing data. Respondents self-reported to be HIV positive not included.

CI: confidence interval; PR: Prevalence Ratio; HIVST: HIV self-testing.

p*<0.05; *p*<0.001.

*Supplemental Table 3. Adjusted associations of provider mistrust and anticipated stigma with preference to HIV self-testing among Filipino MSM**

	aPR (95% CI)	Robust SE	p-value
Anticipated stigma	1.51 (1.01 – 2.26)	0.31	0.044
Provider mistrust	1.51 (1.08 – 2.12)	0.26	0.017

* Adjusted analyses included N=605 for stigma and N=596 for provider mistrust due to missing data for some of the covariates. Respondents self-reported to be HIV positive not included.

PRs are adjusted for age, education, HIV status, know where to get tested, monthly income, relationship status.

aPR: adjusted Prevalence Ratio; SE: standard error.

Supplemental Table 4. Interaction between anticipated stigma and provider mistrust on preference for HIV self-testing among Filipino MSM*

Provider mistrust	Anticipated stigma				PR (95% CI) for anticipated stigma within strata of provider mistrust
	<i>n</i> HIVST/ other testing	No PR (95% CI)	<i>n</i> HIVST/ other testing	Yes PR (95% CI)	
No	35/203	1.00	30/168	1.05 (0.62 – 1.77); <i>p</i> =0.848	1.05 (0.62 – 1.77); <i>p</i> =0.848
Yes	3/28	0.43 (0.08 – 2.42); <i>p</i> =0.341	77/230	1.64 (1.07 – 2.53); <i>p</i> =0.023	3.79 (0.68 – 21.04); <i>p</i> =0.127
PR (95% CI) for provider mistrust within strata of anticipated stigma		0.43 (0.08 – 2.42); <i>p</i> =0.341		1.56 (1.02 – 2.40); <i>p</i> =0.043	

Measure of interaction on additive scale: RERI (95% CI) = 1.16 (0.23 – 2.08); *p* = 0.014.

PRs are adjusted for age, education, HIV status, know where to get tested, monthly income, relationship status.

CI: confidence interval; PR: Prevalence Ratio; RERI: relative excess risk due to interaction.

* Adjusted analyses included N=590 due to missing data for some of the covariates. Respondents self-reported to be HIV positive not included.

Supplemental Table 5. Modification of the association of anticipated stigma on preference for HIV self-testing by disclosure of sexual orientation among Filipino MSM*

Disclosure of sexual orientation	Anticipated stigma				PR (95% CI) for anticipated stigma within strata of disclosure
	No		Yes		
	<i>n</i> HIVST/ other testing	PR (95% CI)	<i>n</i> HIVST/ other testing	PR (95% CI)	
Yes	30/202	1.00	86/346	1.45 (0.94 – 2.25); <i>p</i> =0.097	1.45 (0.94 – 2.25); <i>p</i> =0.097
No	8/29	1.13 (0.43 – 3.00); <i>p</i> =0.809	29/65	1.94 (1.15 – 3.26); <i>p</i> =0.013	1.72 (0.65 – 4.54); <i>p</i> =0.275

Measure of effect modification on additive scale: RERI (95% CI) = 0.37 (-0.89 – 1.63); *p* = 0.568.

PRs are adjusted for age, education, HIV status, know where to get tested, income, relationship status.

CI: confidence interval; PR: Prevalence Ratio; RERI: relative excess risk due to interaction.

* Adjusted analyses included N=605 due to missing data for some of the covariates. Respondents self-reported to be HIV positive not included.

Supplemental Table 6. Modification of the association of provider mistrust on preference for HIV self-testing by disclosure of sexual orientation among Filipino MSM*

Disclosure of sexual orientation	Provider mistrust				PR (95% CI) for provider mistrust within strata of disclosure
	n HIVST/ other testing	No PR (95% CI)	n HIVST/ other testing	Yes PR (95% CI)	
Yes	52/320	1.00	58/227	1.45 (0.98 – 2.12); <i>p</i> =0.060	1.45 (0.98 – 2.12); <i>p</i> =0.060
No	13/53	1.25 (0.65 – 2.41); <i>p</i> =0.508	24/36	2.08 (1.31 – 3.30); <i>p</i> =0.002	1.67 (0.82 – 3.39); <i>p</i> =0.160

Measure of effect modification on additive scale: RERI (95% CI) = 0.39 (-0.76 – 1.53); *p* = 0.507.

PRs are adjusted for age, education, HIV status, know where to get tested, income, relationship status.

CI: confidence interval; PR: Prevalence Ratio; RERI: relative excess risk due to interaction.

* Adjusted analyses included N=596 due to missing data for some of the covariates. Respondents self-reported to be HIV positive not included.

Supplemental Table 7. Crude associations between covariates and preference for HIVST among Filipino MSM^a

Characteristic	Total <i>n</i>	HIVST		Facility/community-based testing		Crude PR (95% CI)
		<i>n</i> 167	% 18.6	<i>n</i> 732	% 81.4	
Age						
18 – 24	300	36	12.0	264	88.0	1.0
25 – 34	424	89	21.0	335	79.0	1.7 (1.2 – 2.5)*
≥ 35	166	42	25.3	124	74.7	2.1 (1.4 – 3.2)**
Disclosure of sexual orientation						
Yes	751	125	16.6	626	83.4	1.0
No	148	42	28.4	106	71.6	1.7 (1.3 – 2.3)*
Relationship status						
Single, not looking for a relationship	183	22	12.0	161	88.0	1.0
Single, looking only for serious relationship	323	71	22.0	252	78.0	1.8 (1.2 – 2.8)*
Single, looking only for casual relationship	116	31	26.7	85	73.3	2.2 (1.4 – 3.6)*
In a relationship, exclusive	174	22	12.6	152	87.4	1.1 (0.6 – 1.8)
In a relationship, open	103	21	20.4	82	79.6	1.7 (1.0 – 2.9) ⁺
Education						
College undergraduate & below	207	29	14.0	178	86.0	1.0
At least college graduate	656	127	19.4	529	80.6	1.4 (1.0 – 2.0) ⁺
Employment status ^a						
Unemployed	118	19	16.1	99	83.9	1.0
Employed	722	136	18.8	586	81.2	1.2 (0.8 – 1.8)
Monthly income (Philippine peso)						
10K & below	169	25	14.8	144	85.2	1.0
Above 10K	589	116	19.7	473	80.3	1.3 (0.9 – 2.0)
Know where to get tested						
Yes	649	99	15.3	550	84.8	1.0
No	250	68	27.2	182	72.8	1.8 (1.4 – 2.3)**
Recent HIV test						
Past 12 months	406	42	10.3	364	89.7	1.0
Never tested	300	82	27.3	218	72.7	2.6 (1.9 – 3.7)**
> 1 year ago	193	43	22.3	150	77.7	2.2 (1.5 – 3.2)**
HIV status						
Negative	467	65	13.9	402	86.1	1.0
Positive	84	11	13.1	73	86.9	0.9 (0.5 – 1.7)
Unsure	293	79	27.0	214	73.0	1.9 (1.4 – 2.6)**
Anticipated stigma	3.3 (2.0 – 5.0)	4.7 (2.7 – 6.0)		3.0 (2.0 – 4.7)		1.3 (1.2 – 1.4)**
Median (IQR)						
Provider mistrust	2.3 (1.8 – 3.8)	3.0 (2.0 – 4.3)		2.0 (1.8 – 3.3)		1.3 (1.2 – 1.4)**
Median (IQR)						

^a Numbers may not sum to the total sample size due to missing data.

CI: confidence interval; PR: Prevalence Ratio; HIVST: HIV self-testing; IQR: Interquartile range.

⁺*p*<0.10; **p*<0.05; ***p*<0.001.

Supplemental Table 8. Adjusted associations of provider mistrust and anticipated stigma with preference to HIV self-testing among Filipino MSM*

	Models 1 & 2	Model 3 (Interaction)
	aPR (95% CI); <i>p</i> -value	aPR (95% CI); <i>p</i> -value
Anticipated stigma	1.26 (1.14 – 1.39); <i>p</i> <0.001	1.25 (1.03 – 1.51); <i>p</i> <0.023
Provider mistrust	1.22 (1.11 – 1.34); <i>p</i> <0.001	1.07 (0.77 – 1.48); <i>p</i> <0.070

Measure of interaction on additive scale (Model 3): RERI (95% CI) = 0.16 (-0.97 – 1.29); *p* = 0.781.

* Adjusted analyses included N=691 due to missing data for some of the covariates.

PRs are adjusted for age, education, HIV status, know where to get tested, monthly income, relationship status.

aPR: adjusted Prevalence Ratio; CI: confidence interval; RERI: relative excess risk due to interaction.

Supplemental Table 9. Modification of the association of anticipated stigma and provider mistrust on preference for HIV self-testing by disclosure of sexual orientation among Filipino MSM*

	Disclosure of sexual orientation		RERI
	Yes	No	
	aPR (95% CI); <i>p-value</i>		
Anticipated stigma (Model 4)	1.22 (1.00 – 1.47); <i>P=0.045</i>	1.27 (1.14 – 1.42); <i>P<0.001</i>	-0.66 (-23.28 – 21.95); <i>P0.954</i>
Provider mistrust (Model 5)	1.21 (1.01 – 1.46); <i>P=0.041</i>	1.22 (1.10 – 1.36); <i>P<0.001</i>	2.73 (-20.27 – 25.73); <i>P0.816</i>

* Adjusted analyses included N=691 due to missing data for some of the covariates.

PRs are adjusted for age, education, HIV status, know where to get tested, monthly income, relationship status.

aPR: adjusted Prevalence Ratio; CI: confidence interval; RERI: relative excess risk due to interaction.

References

1. Joint United Nations Programme on HIV/AIDS. UNAIDS Data 2019 [Internet]. 2019. Available from: https://www.unaids.org/sites/default/files/media_asset/2019-UNAIDS-data_en.pdf
2. Department of Health. HIV/AIDS and ART Registry of the Philippines: Newly diagnosed HIV cases in the Philippines. 2019.
3. Department of Health. Integrated HIV Behavioral and Serologic Surveillance [Internet]. 2015. Available from: https://www.doh.gov.ph/sites/default/files/publications/Philippines_2015_IHBSS_Fact_Sheets_Nov2017_22JUN2016.pdf
4. Joint United Nations Programme on HIV/AIDS. UNAIDS Data 2020 [Internet]. 2020. Available from: <https://www.unaids.org/en/resources/documents/2020/unaids-data>
5. Mahajan AP, Sayles JN, Patel VA, Remien RH, Ortiz D, Szekeres G, et al. Stigma in the HIV/AIDS epidemic: a review of the literature and recommendations for the way forward. *AIDS*. 2008;22(Suppl 2):S67–79.
6. Deblonde J, De Koker P, Hamers FF, Fontaine J, Luchters S, Temmerman M. Barriers to HIV testing in Europe: a systematic review. *Eur J Public Health*. 2010;20(4):422–32.
7. Chimoyi L, Tshuma N, Muloongo K, Setswe G, Sarfo B, Nyasulu PS. HIV-related knowledge, perceptions, attitudes, and utilisation of HIV counselling and testing: a venue-based intercept commuter population survey in the inner city of Johannesburg, South Africa. *Glob Health Action*. 2015;8(1):26950.
8. Pharr JR, Lough NL, Ezeanolue EE. Barriers to HIV Testing Among Young Men Who Have Sex With Men (MSM): Experiences from Clark County, Nevada. *Glob J Health Sci*. 2016;8(7):9.
9. de Lind van Wijngaarden JW, Ching AD, Settle E, van Griensven F, Cruz RC, Newman PA. “I am not promiscuous enough!”: Exploring the low uptake of HIV testing by gay men and other men who have sex with men in Metro Manila, Philippines. *PLoS One*. 2018;13(7):e0200256.
10. Brincks AM, Shiu-Yee K, Metsch LR, del Rio C, Schwartz RP, Jacobs P, et al. Physician mistrust, medical system mistrust, and perceived discrimination: Associations with HIV care engagement and viral load. *AIDS Behav*. 2019;23(10):2859–69.

11. World Health Organization. Consolidated guidelines on HIV testing services. Geneva, Switzerland; 2015.
12. World Health Organization. WHO recommends HIV self-testing: evidence update and considerations for success: policy brief. 2019.
13. Krause J, Subklew-Sehume F, Kenyon C, Colebunders R. Acceptability of HIV self-testing: a systematic literature review. *BMC Public Health*. 2013;13(1):735.
14. Johnson CC, Kennedy C, Fonner V, Siegfried N, Figueroa C, Dalal S, et al. Examining the effects of HIV self-testing compared to standard HIV testing services: a systematic review and meta-analysis. *J Int AIDS Soc*. 2017;20(1):21594.
15. Gohil J, Baja ES, Sy TR, Guevara EG, Hemingway C, Medina PMB, et al. Is the Philippines ready for HIV self-testing? *BMC Public Health*. 2020;20(1):1–8.
16. Brenick A, Romano K, Kegler C, Eaton LA. Understanding the influence of stigma and medical mistrust on engagement in routine healthcare among black women who have sex with women. *LGBT Heal*. 2017;4(1):4–10.
17. LaVeist TA, Isaac LA, Williams KP. Mistrust of health care organizations is associated with underutilization of health services. *Health Serv Res*. 2009;44(6):2093–105.
18. Koutentakis K, Hoyos J, Rosales-Statkus M-E, Guerras J-M, Pulido J, de la Fuente L, et al. HIV self-testing in Spain: A valuable testing option for men-who-have-sex-with-men who have never tested for HIV. *PLoS One*. 2019;14(2):e0210637.
19. Liverpool School of Tropical Medicine. HIV GET Tested [Internet]. 2016 [cited 2020 May 13]. Available from: <https://etch.lstmed.ac.uk/projects/hiv-get-tested>
20. Textor J, van der Zander B, Gilthorpe MK, Liskiewicz M, Ellison GTH. Robust causal inference using directed acyclic graphs: the R package “dagitty.” *Int J Epidemiol*. 2016;45(6):1887–94.
21. Philippine Statistics Authority. Poverty in the Philippines: Evidence from the 2018 Official Poverty Statistics [Internet]. 2020. Available from: http://ateneo.edu/sites/default/files/downloadable-files/Poverty_in_the_Philippines.pdf
22. Barros AJ, Hirakata VN. Alternatives for logistic regression in cross-sectional studies: an empirical comparison of models that directly estimate the prevalence ratio. *BMC Med Res Methodol*. 2003;3(1):1–13.
23. VanderWeele TJ, Knol MJ. A tutorial on interaction. *Epidemiol Method*. 2014;3(1):33–72.

24. StataCorp. Stata Statistical Software: Release 16. College Station, Texas: StatCorp LLC; 2019.
25. Pai NP, Sharma J, Shivkumar S, Pillay S, Vadnais C, Joseph L, et al. Supervised and unsupervised self-testing for HIV in high-and low-risk populations: a systematic review. *PLoS Med*. 2013;10(4):e1001414.
26. Figueroa C, Johnson C, Verster A, Baggaley R. Attitudes and acceptability on HIV self-testing among key populations: a literature review. *AIDS Behav*. 2015;19(11):1949–65.
27. Indravudh PP, Sibanda EL, D’Elbée M, Kumwenda MK, Ringwald B, Maringwa G, et al. I will choose when to test, where I want to test’: investigating young people’s preferences for HIV self-testing in Malawi and Zimbabwe. *AIDS*. 2017;31((Suppl 3)):S203.
28. Tonen-Wolyec S, Batina-Agasa S, Muwonga J, Mboumba Bouassa R-S, Kayembe Tshilumba C, Bélec L. Acceptability, feasibility, and individual preferences of blood-based HIV self-testing in a population-based sample of adolescents in Kisangani, Democratic Republic of the Congo. *PLoS One*. 2019;14(7):e0218795.
29. Piamonte SBH, Ditangco RA. Awareness and Willingness to Pay for HIV Self-test Among Men who have Sex With Men from Metro Manila, Philippines. *Malaysian J Public Heal Med*. 2020;20(1):64–70.
30. APCOM. Understanding the Values and Preferences of Men who have Sex with Men and Transgender People on HIV Self-Testing and Partner Notification in Asia and the Pacific [Internet]. 2017. Available from: https://www.apcom.org/wp-content/uploads/2018/08/Report-HIVSTPN_V3.pdf
31. O’Donnell K, Fitzgerald M, Quinlan M, Hickson F, Keogh P, Schmidt A, et al. Inequalities in HIV testing uptake and needs among men who have sex with men living in Ireland: findings from an internet survey. *HIV Med*. 2019;20(2):157–63.
32. Miners A, Nadarzynski T, Witzel C, Phillips AN, Cambiano V, Rodger AJ, et al. Preferences for HIV testing services among men who have sex with men in the UK: A discrete choice experiment. *PLoS Med*. 2019;16(4):e1002779.
33. Harichund C, Karim QA, Kunene P, Simelane S, Moshabela M. HIV self-testing as part of a differentiated HIV testing approach: exploring urban and rural adult experiences from KwaZulu-Natal, South Africa using a cross-over study design. *BMC Public Health*. 2019;19(1):53.

34. Katz DA, Golden MR, Hughes JP, Farquhar C, Stekler JD. HIV Self-Testing Increases HIV Testing Frequency in High Risk Men Who Have Sex with Men: A Randomized Controlled Trial. *J Acquir Immune Defic Syndr*. 1999;78(5):505.
35. Graham JL, Giordano TP, Grimes RM, Slomka J, Ross M, Hwang L-Y. Influence of trust on HIV diagnosis and care practices. *J Int Assoc Physicians AIDS Care*. 2010;9(6):346–52.
36. Golub SA, Gamarel KE. The impact of anticipated HIV stigma on delays in HIV testing behaviors: findings from a community-based sample of men who have sex with men and transgender women in New York City. *AIDS Patient Care STDS*. 2013;27(11):621–7.
37. Eaton LA, Driffin DD, Kegler C, Smith H, Conway-Washington C, White D, et al. The role of stigma and medical mistrust in the routine health care engagement of black men who have sex with men. *Am J Public Health*. 2015;105(2):e75–82.
38. Gamarel KE, Nelson KM, Stephenson R, Rivera OJ, Chiamonte D, Miller RL, et al. Anticipated HIV stigma and delays in regular HIV testing behaviors among sexually-active young gay, bisexual, and other men who have sex with men and transgender women. *AIDS Behav*. 2018;22(2):522–30.
39. Whitehead J, Shaver J, Stephenson R. Outness, Stigma, and Primary Health Care Utilization among Rural LGBT Populations. *PLoS One*. 2016;11(1).
40. Qin Y, Han L, Babbitt A, Walker JS, Liu F, Thirumurthy H, et al. Experiences using and organizing HIV self-testing: a global qualitative systematic review. *AIDS*. 2018;32(3):371.
41. UNAIDS. Quezon City's HIV programme becomes a model for other cities [Internet]. 2017 [cited 2020 Dec 1]. Available from: https://www.unaids.org/en/resources/presscentre/featurestories/2017/july/20170713_quezon