

Acceptability and Feasibility of a Social-Entrepreneurship Model to Promote HIV Self-testing and linkage to care among MSM

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Summary: We built and evaluated a Social Entrepreneurship Model (SET) to promote HIVST linkage to care among Chinese MSM in Guangzhou. This model is acceptable and feasible, and it adds a new testing platform to the current testing service system.

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Abstract

Background: HIV self-testing (HIVST) offers an opportunity to increase HIV testing among people not reached by facility-based services. However, the promotion of HIVST is limited due to insufficient community engagement. We built a Social Entrepreneurship Model (SET) to promote HIVST linkage to care among Chinese MSM in Guangzhou.

Method: SET model includes a few key steps: Each participant first completed an online survey, and paid a \$23 USD (refundable) deposit to get a HIVST kit and a syphilis self-testing (SST) kit. After the testing, the results were sent to the platform by the participants and interpreted by CDC staff. Meanwhile, the deposit was returned to each participant. Finally, the CBO contacted the participants to provide counseling services, confirmation testing and linkage to care.

Result:

During April-June of 2015, a total of 198 MSM completed a preliminary survey and purchased self-testing kits. Among them, the majority were aged under 34 (84.4%) and met partners online (93.1%). In addition, 68.9% of participants ever tested for HIV, and 19.5% had ever performed HIVST. Overall, feedback was received from 192 (97.0%) participants. Among these, 14 people did not use kits, and the HIV and syphilis prevalence among these users were of 4.5% (8/178) and 3.7% (6/178), respectively. All of the screened HIV-positive cases sought further confirmation testing and were linked to care.

Conclusion:

Using an online SET model to promote HIV and syphilis among Chinese MSM is acceptable and feasible, and this model adds a new testing platform to the current testing service system.

Introduction

As the critical entry point into a cascade of service(1), HIV testing is widely used to monitor and control the epidemic of HIV.(2) However, globally, only 51% of people with HIV know their status.(3) In China, about 50% of men who have sex with men (MSM) have never tested for HIV.(4) This lack of awareness plays a key role in HIV transmission.(5, 6) As a user-friendly, rapid and accurate approach, HIV self-testing (HIVST) has potential to become an important solution for this dilemma.(7)

HIVST is a process whereby a person who wants to know his/her HIV status collects a specimen (oral swab or blood), performs a test, and interprets the test result in private, which is different from facility-based HIV testing.(8) Facility-based HIV testing was defined as HIV testing conducted in health-care facilities (clinics, hospitals, fixed stand-alone voluntary counselling and testing sites).(9) In China, facility-based HIV testing also include community testing sites that supported by government, as majority of the community testing sites are also voluntary counseling and testing sites of government. This provides an opportunity for people to test themselves discreetly and conveniently.(10)

Even as HIVST becomes more and more popular, its implementation is still limited by insufficient community engagement and poor promotion. For example, in China, HIVST kits are mainly distributed through online stores, which are organized entirely by private companies with poor HIVST counseling and insufficient attention to linkage.(11) To address these issues, we built a social-entrepreneurship HIVST (SET) model, and to evaluate the acceptability and feasibility of this model in promotes HIV testing and linkage to care among Chinese MSM. Guangzhou provides a unique opportunity to conduct this study. First, the HIV prevalence among MSM in Guangzhou is very high and still increasing, while HIV testing rate is still low.(12, 13) Second, Guangzhou is one of the very first cities that promote HIVST in China, and several different models has been tried. Third, Guangzhou has one of the largest community based organizations (Guangzhou Tongzhi, GZTZ) in China, and this organization has about 10 years of experience on providing friendly service to MSM in Guangzhou, which can reduce stigma and promote confidentiality.(14)

Methods

Ethics review committees in Guangzhou Center for Disease Prevention and Control reviewed and approved the study prior to the launch.

SET model development

To promote HIV testing among Chinese MSM, we build an online platform-SET model. This model included the following key steps: First, participants who were males, ≥ 18 years old, residing in Guangzhou, ever engaged in anal sex with a man, and willing to provide a cell phone number and address were recruited to complete an online survey. Second, after the survey, eligible participants paid a \$23 USD (refundable) deposit in exchange for HIVST and syphilis self-testing (SST) kits. Third, the self-testing packages were shipped to the address provided by the participants. Fourth, after receiving the testing kits and performing self-testing, the participants took pictures of the kits showing the testing results, and sent it back to us. Fifth, the study staff then interpreted the results and gave feedback to the participants. Meanwhile, the deposit was then refunded afterward. Finally, GZTZ contacted individuals testing positive for HIV or syphilis to provide counseling services, confirmation testing and linkage to care. (Figure 1). If participants did not report their results to the group within four weeks, a follow up call was made to each of them.

Measures

Socio-demographic information collected included age, marital status, living situation, occupation, education, and income. Participants were asked about their sexual orientation as well as their preferred sexual role during anal sex, number of sexual partners in the last six months, and condomless anal intercourse with regular and casual male partners in the last six months and during the last intercourse.

Participants were also asked whether they had ever tested for HIV (yes/no), frequency of HIV testing (every three months, every six months, every year or other) and why they had chosen to undergo HIV testing. If participants reported any HIV testing history, they were further asked about HIVST history (yes/no), source of HIVST kits (online, from friends, pharmacy or others)

and reasons for performing HIVST. In addition, we also obtained information regarding where participants would conduct HIVST, who would be present while they tested, whether they would seek confirmation testing, with what frequency they would be willing to complete HIVST, and potential barriers for HIVST.

HIV and syphilis self-testing

Finger prick blood samples were collected by each participant for the HIV and syphilis rapid testing. The rapid test kits that were used in our study included Colloidal Gold Device Rapid Test for Antibody to Human Immunodeficiency Virus (Beijing Wantai Biological Pharmacy Enterprise Co. Ltd., Beijing, China) and Colloidal Gold Device Rapid Test for Antibody to syphilis (Beijing Wantai Biological Pharmacy Enterprise Co. Ltd., Beijing, China). All participants screening positive for HIV or syphilis were encouraged to undergo confirmation testing.

Statistical Analysis

Using responses from participants who purchased self-testing kits, descriptive analysis was performed to describe the socio-demographics, risk behaviors, willingness to complete HIVST, barriers and facilitators of HIVST. Univariate and multivariate logistic regressions were used to compare people who did and did not apply for self-testing kits after finishing the online survey. The multivariate logistic regression models were adjusted for demographic characteristics including age (continuous), marital status, education and monthly income. Data analysis was completed using SAS version 9.3 (SAS Int. Cary, NC, USA).

Results

Participants

Of the 555 people signed the consent form, 21 did not meet eligibility requirements and 115 did not finish the online survey. Among the 380 participants who completed the online survey, a total of 198 persons bought the self-testing kits.

More than half of the people who finished the online survey were between 25 and 34 years old

(54.2%) and had a monthly income of around 800 USD or less. In addition, the majority of participants were never married (88.7%) and had a college degree or higher (85.2%). (Table 1)

The majority of the participants found partners through Internet (92.1%), self-identified as homosexual (78.4%), and had engaged in anal sex with men in the last six months (81.6%). In addition, 57.6% of the participants reported that they had two or more partners in the last six months, and 39.5% of the participants had engaged in condomless anal intercourse in the last six months. In addition, 68.9% of the participants had ever tested for HIV and 19.5% had ever performed HIVST.

Among the 198 MSM who purchased HIVST kits, 72.2% (143) of them ever tested for HIV before, and 62.1% (123) of them ever tested at facility based sites. Overall, self-testing successfully reached about two-fifths (37.9%) of MSM not reached by facility based HIV testing.

Testing results and linkage to care

From those who purchased the kits, feedback was received from 192 (97.0%) participants. Among these, 178 (92.7%) of them had performed HIV and syphilis self-testing within four weeks after purchased the kits online (Figure 1). Of the 178 people who performed self-testing, HIV and syphilis prevalence of 4.5% (8/178) and 3.7% (6/178), respectively.

All of the screened HIV positive case sought further confirmation testing, and, seven were newly identified HIV positive cases. All the newly identified self-tested positive cases were confirmed to be HIV-positive, and they were linked to care and got their first CD4 count testing. All the six syphilis-positive cases were encouraged to undergo further confirmation testing at either local CDCs or hospitals.

Comparison between those purchased the self-testing kits and not

Table 1 gives the demographic and behavior data of participants who did and did not purchase the self-testing kits. The two groups are comparable except that participants reporting more

sexual partners in the last six months were more likely to purchase the kits. Multivariate regression analysis indicated that participants with more than 5 partners in the last six months were more likely to purchase the kits (adjusted OR=2.49, 95% CI: 1.08-5.71).

Willingness of HIVST

The primary reason for choosing HIVST was convenience and to save time (46.3%), followed by protection of privacy (40.0%), ease of use (6.3%) and accuracy (5.8%). The top two places where participants would be willing to obtain the self-testing kits were online stores (71.6%) and pharmacies (35.3%). The majority of the participants purchased the kit for themselves (90.8), wanted to use the kits at home (95.0%) and alone (72.1%). Only 7.6% of the buyers reported that they would not seek counseling after HIVST, and 66.8% people reported that they would use HIVST in the future, if it was free (Supplement Table 1).

Facilitators and barriers for HIVST

The top three self-reported facilitators for HIVST among people who purchased the kits included anonymity (55.8%), ease of use (49.0%) and ability to test alone (40.8%). The top three self-reported barriers for HIVST were concern about the accuracy of the test (42.9%), potential cost (40.3%), and concern about self-interpreting results (36.3%). (Supplement Table 2).

Discussion

Our piloted study found that a SET model is acceptable and feasible for promotion of HIV self-testing among MSM, and it adds a new useful platform to the current testing service system. Our study builds on previous research promoting HIVST among key populations by creating an inventive HIVST model, evaluating its acceptability and feasibility, reporting linkage to care results and answering concerns of HIVST (on linkage to care and counseling) raised by other researchers.

In our study, over 97% people reported the testing results back to the group, and all of the eight self-tested and confirmed HIV positive cases were linked to care. These high rates highlight the

feasibility of the SET model. In addition, it disproved the concern that participants would avoid seeking healthcare if the result were positive(15, 16). Furthermore, the SET model provided evidence that using mobile health technologies to track self-testing and linkage to care is feasible, in response to the recommendations raised by Mavedzenge et al(15).

Our study indicated that about half of the people who completed the online survey and stated willingness to buy the kits did not purchase the kits. One potential explanation is the complicated process of the SET model, which may have reduced the enthusiasm of some of the participants. Another potential explanation is that participants needed to pay the deposit online, and some of them may have had no online payment experience. Finally, the requirement of reporting the testing results to get the refund back could be another important reason.

Worry about the testing accuracy and cost are the top two concerns of the participants. These findings are consistent with previous studies focusing on the acceptability of HIVST. (15) To reduce these barriers, our SET model included the most widely used HIV rapid testing kits in China, which have very good testing accuracy. In addition, we provided very detailed testing instructions to the participants, and asked them to send the pictures back to allow the group to interpret the results.

Our study has several limitations. First, the sample size of our study is small, as only 198 people purchased the kits. We will continue the project and further expand HIVST among MSM. Second, we only asked that participants return the testing kits to us, but did not collect information during the follow-up period on user experience when using the kits. Third, 115 people who met the inclusion criteria drop-out from the study before the online survey. One potential reason for this drop out is that these drop-outers may only want to get HIVST, but do not willing to fill the questionnaires. For implementation purpose, we may need to simplify the process. Finally, since the online survey targeted people willing to take HIVST, we cannot determine what types of populations are less likely to test through our SET model.

Our results suggest that using the SET model to promote HIV testing using HIVST and linkage

to care among Chinese MSM is feasible and acceptable. This new tool may be especially useful in low and middle-income countries where community organizations are very involved in HIV prevention, and where internet access is good.

Table 1 Demographic characteristics and behaviors of the MSM who finished the online survey, and variables associated with final purchasing self-testing kits among MSM who are willing to perform HIVST in China, 2015(N=380)

| Variables | Total (N=380) | | Purchased kits (n=198) | | Not purchased kits (n=182) | | Crude Model | Adjusted Model* |
|-----------------------|------------------------------------|---------|------------------------|---------|----------------------------|---------|-------------|-----------------|
| | Frequency | Percent | Frequency | Percent | Frequency | Percent | OR (95%CI) | OR (95%CI) |
| Age | <i>Less than 25</i> | 111 | 29.2 | 54 | 27.3 | 57 | 31.3 | |
| | <i>25-34</i> | 206 | 54.2 | 113 | 57.1 | 93 | 51.1 | |
| | <i>35 and above</i> | 63 | 16.6 | 31 | 15.7 | 32 | 17.6 | |
| Marital status | <i>Ever married</i> | 43 | 11.3 | 16 | 8.1 | 27 | 14.8 | |
| | <i>Never Married</i> | 337 | 88.7 | 182 | 91.9 | 155 | 85.2 | |
| Education | <i>Senior high school or below</i> | 56 | 14.8 | 22 | 11 | 34 | 18.7 | |
| | <i>College/Bachelor</i> | 273 | 71.8 | 152 | 76.8 | 121 | 66.5 | |
| | <i>Masters or PhD</i> | 51 | 13.4 | 24 | 12.2 | 27 | 14.8 | |
| Monthly income | <i>300 USD or below</i> | 79 | 20.8 | 37 | 18.7 | 42 | 23.1 | |
| | <i>301-800 USD</i> | 125 | 32.9 | 62 | 31.3 | 63 | 34.6 | |
| | <i>801-1500 USD</i> | 102 | 26.8 | 56 | 28.3 | 46 | 25.3 | |

| | | | | | | | | | |
|-------------------------------------------------------------------|-----------------------|-----|------|-----|------|-----|------|------------------------------|------------------------------|
| | <i>Above 1500 USD</i> | 74 | 19.5 | 43 | 21.7 | 31 | 17 | | |
| Venue | <i>Internet</i> | 350 | 92.1 | 186 | 94 | 164 | 90.1 | 1.70(0.80,3.64) | 1.53(0.69,3.42) |
| | <i>Others</i> | 30 | 7.9 | 12 | 6.1 | 18 | 9.9 | <i>Ref</i> | <i>Ref</i> |
| Sexual orientation | <i>Homosexual</i> | 298 | 78.4 | 158 | 79.8 | 140 | 76.9 | 1.19(0.73,1.93) | 1.17(0.70,1.93) |
| | <i>Bisexual</i> | 82 | 21.6 | 40 | 20.2 | 42 | 23.1 | <i>Ref</i> | <i>Ref</i> |
| Sexual role | <i>Insertive</i> | 113 | 29.7 | 57 | 28.8 | 56 | 30.8 | 0.91(0.57,1.47) | 0.89(0.54,1.46) |
| | <i>Acceptive</i> | 100 | 26.3 | 53 | 26.8 | 47 | 25.8 | 1.01(0.62,1.67) | 0.95(0.57,1.59) |
| Engaged in anal sex with men in last 6 months | <i>No preference</i> | 167 | 43.9 | 88 | 44.4 | 79 | 43.4 | <i>Ref</i> | <i>Ref</i> |
| | <i>Yes</i> | 310 | 81.6 | 164 | 82.8 | 146 | 80.2 | 1.19(0.71,2.00) | 1.18(0.69,2.02) |
| Number of partners in the last six months | <i>No</i> | 70 | 18.4 | 34 | 17.2 | 36 | 19.8 | <i>Ref</i> | <i>Ref</i> |
| | <i>0</i> | 70 | 18.4 | 34 | 17.2 | 36 | 19.8 | <i>Ref</i> | <i>Ref</i> |
| | <i>1</i> | 91 | 24 | 41 | 20.7 | 50 | 27.5 | 0.87(0.47,1.62) | 0.80(0.42,1.53) |
| Engaged in CAI in the last six months | <i>2 to 5</i> | 175 | 46.1 | 93 | 47 | 82 | 45.1 | 1.20(0.69,2.09) | 1.22(0.68,2.18) |
| | <i>Above 5</i> | 44 | 11.6 | 30 | 15.2 | 14 | 7.7 | 2.27(1.03,4.99) [#] | 2.49(1.08,5.71) [#] |
| Used condom during last anal intercourse | <i>Yes</i> | 150 | 39.5 | 72 | 36.4 | 78 | 42.8 | 0.76(0.50,1.15) | 0.77(0.50,1.18) |
| | <i>No</i> | 230 | 60.5 | 126 | 63.6 | 104 | 57.2 | <i>Ref</i> | <i>Ref</i> |
| Have a regular partner in the last six months | <i>Yes</i> | 227 | 73.2 | 123 | 75 | 104 | 71.2 | 1.21(0.73,2.00) | 1.19(0.70,2.03) |
| | <i>No</i> | 83 | 26.8 | 41 | 25 | 42 | 28.8 | <i>Ref</i> | <i>Ref</i> |
| Engaged in CAI with regular partner in the last six months | <i>Yes</i> | 203 | 53.4 | 104 | 52.5 | 99 | 54.4 | 0.93(0.62,1.39) | 0.96(0.63,1.45) |
| | <i>No</i> | 177 | 46.6 | 94 | 47.5 | 83 | 45.6 | <i>Ref</i> | <i>Ref</i> |
| | <i>Yes</i> | 100 | 26.3 | 50 | 25.3 | 50 | 27.5 | 0.89(0.57,1.41) | 0.91(0.57,1.47) |
| | <i>No</i> | 280 | 73.7 | 148 | 74.7 | 132 | 72.5 | <i>Ref</i> | <i>Ref</i> |
| | <i>0</i> | 194 | 51.1 | 95 | 48 | 99 | 54.4 | <i>Ref</i> | <i>Ref</i> |
| | <i>1</i> | 65 | 17.1 | 30 | 15.1 | 35 | 19.2 | 0.89(0.51,1.57) | 1.00(0.55,1.81) |

| | | | | | | | | | |
|-----------------------------------------------------------------------------|--------------------------------|-----|------|-----|------|-----|------|-------------------|-------------------|
| Number of casual partners in the last six months | <i>2 or above</i> | 121 | 31.8 | 73 | 36.9 | 48 | 26.4 | 1.59(1.00,2.51) | 1.59(0.99,2.57) |
| Engaged in CAI with casual partner in the last six months | <i>Yes</i> | 84 | 22.1 | 39 | 19.7 | 45 | 24.7 | 0.75(0.46,1.21) | 0.82(0.49,1.37) |
| | <i>No</i> | 296 | 77.9 | 159 | 80.3 | 137 | 75.3 | <i>Ref</i> | <i>Ref</i> |
| Engaged in commercial sex with men in the last six months | <i>Yes</i> | 53 | 13.9 | 27 | 13.6 | 26 | 14.3 | 0.95(0.53,1.69) | 1.02(0.55,1.88) |
| | <i>No</i> | 327 | 86.1 | 171 | 83.4 | 156 | 85.7 | <i>Ref</i> | <i>Ref</i> |
| Engaged in group sex in the last six months | <i>Yes</i> | 24 | 6.3 | 12 | 6.1 | 12 | 6.6 | 0.91(0.40,2.09) | 1.03(0.43,2.45) |
| | <i>No</i> | 356 | 93.7 | 186 | 93.9 | 170 | 93.4 | <i>Ref</i> | <i>Ref</i> |
| Engaged in sex with women in last six months | <i>Yes</i> | 34 | 8.9 | 13 | 6.6 | 21 | 11.5 | 0.54(0.26,1.11) | 0.61(0.28,1.31) |
| | <i>No</i> | 346 | 91.1 | 185 | 93.4 | 161 | 88.5 | <i>Ref</i> | <i>Ref</i> |
| Engaged in condomless virginal sex with women in the last six months | <i>Yes</i> | 17 | 4.5 | 7 | 3.5 | 10 | 5.5 | 0.63(0.24,1.69) | 0.72(0.25,2.03) |
| | <i>No</i> | 363 | 95.5 | 191 | 96.5 | 172 | 94.5 | <i>Ref</i> | <i>Ref</i> |
| Ever tested for HIV | <i>Yes</i> | 262 | 68.9 | 143 | 72.2 | 119 | 65.4 | 1.38(0.89,2.13) | 1.24(0.79,1.97) |
| | <i>No</i> | 118 | 31.1 | 55 | 27.8 | 63 | 34.6 | | |
| Ever performed HIV self-testing | <i>Yes</i> | 74 | 19.5 | 40 | 20.2 | 34 | 18.7 | 1.10 (0.66, 1.83) | 1.01 (0.60, 1.72) |
| | <i>No</i> | 306 | 80.5 | 158 | 79.8 | 148 | 81.3 | <i>Ref</i> | <i>Ref</i> |
| HIV testing frequency | <i>Every 3 months or short</i> | 48 | 18.3 | 26 | 18.2 | 22 | 18.5 | <i>Ref</i> | <i>Ref</i> |
| | <i>Every 6months</i> | 70 | 26.7 | 37 | 25.9 | 33 | 27.7 | 0.95(0.45,1.98) | 0.97(0.45,2.11) |
| | <i>Every year</i> | 25 | 9.5 | 15 | 10.5 | 10 | 8.4 | 1.27(0.48,3.39) | 1.19(0.43,3.30) |
| | <i>No regular frequency</i> | 119 | 45.4 | 65 | 45.5 | 54 | 45.4 | 1.02(0.52,2.00) | 1.16(0.58,2.35) |

Note: * Model adjusted for age, marital status, education and monthly income; # P<0.05

Figure Legend:

Figure 1 Flowchart

Supplement Legend

Supplement Table 1 Self-testing features of the people who purchased the self-testing kits from SET model in China, 2015 (N=198)

Supplement Table 2 Self-reported Facilitators and barriers of HIVST for people who purchased self-testing kits from SET model in China, 2015 (N=198)

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