What determines HIV self-test acceptability and uptake within the MSM community in Nairobi and its environs? A cross sectional study

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Abstract

Background: Human Immunodeficiency Virus self-test (HIVST) refers to a process where a person collects his or her own specimen (blood or oral), performs a test and interprets the results. The interpretation of results can either be done in private or through support of a trusted partner. Self-test should be seen as screening and confirmatory test should be sort.

Study Objective To determine facilitating factors for HIVST acceptability and uptake among MSM community.

Methods: The researcher employed a cross-sectional exploratory study design, targeting men who have sex with men (MSM) in Nairobi. Adult men (aged 18-60 years) that reported to be actively engaging in anal or oral sex with men were eligible for the study. The researcher used purposive sampling to identify the sites where data was collected, snowballing technique was then employed to reach the respondents. Data was collected between July 2018-June 2019. A total of 391 MSM respondent were recruited to fill the self-administered questionnaires, 369 MSM completed the questionnaires (response rate = 94%).

Results: There was a significant association between self-test and frequency of testing for HIV/AIDS at P-Value of 0.011. The respondents who had a positive result from the previous test were 16% and 80% of the respondents would seek confirmatory test, if tested HIV positive through HIVST. There was also a significant association between respondents who had never tested using self-test kits and the need for a testing “buddy” with a P- Value of 0.014. Fifty nine percent of the respondents would prefer blood sample test kits. High cost of the self-test kits and inadequate knowledge on the use of HIV self-test kits were the main hindrances to HIVST uptake.

Conclusions: A significant number of MSM community in Kenya are willing to use HIVST and are likely to seek for care within 30 days and this is a good indicator of linkage. Blood sample kits are more preferred. Key facilitating factors for HIVST uptake include; awareness creation on HIVST, training on usage of kits, emphasis on testing “buddy” for first time testers and reduction on cost of the kits.

Background

There has been significant progress in HIV prevention efforts across Africa, however men who have sex with men (MSM) continue to bear a disproportionately heavy burden of HIV infection compared to the general adult population [1]. Surveillance data in low and middle income countries shows that MSM are 19.3 times more likely to be living with HIV than the general population [2]. The risk of acquiring HIV is 27 times higher among MSM compared to other heterosexual men [3]. Kenya has the third largest population of people living with HIV in sub-Saharan Africa and the highest national HIV prevalence of any country outside of Southern Africa [4]. HIV in Kenya is characterized as a generalized epidemic among the adult population but a more concentrated epidemic among key populations [5]. The Kenya AIDS Strategic Framework 2014/15 – 2018/19 identified MSM and male sex workers (MSWs), as key populations and has prioritized these populations for HIV/AIDS prevention [6]. The MSM population in Kenya commonly encompasses a range of sexual and gender identities, including homosexual, gay, bisexual, transgendered, and heterosexual. MSM may be married, gay, or sex workers [5]. According to the Kenya HIV Prevention Response and Modes of Transmission Analysis (2008), 15.2 percent of new infections were attributed to MSM [4]. In 2007, HIV prevalence among MSM/MSWs with exclusively male partners was 41 percent in Mombasa [7] and in 2010, HIV prevalence among MSM in Kenya was an estimated 18.2% [8]. When compared to HIV prevalence among the general population, the HIV prevalence among the MSW and MSM is 4 to 5 times higher [5]. The above findings show that the MSM and MSW are at higher risks of acquiring and transmitting HIV and should be prioritized in controlling the HIV epidemic in Kenya.

A significant number of HIV positive individuals in Sub-Saharan (SSA) are not aware of their HIV sero-status, more than half (53%) of the 1.6 million people living with HIV in Kenya are unaware of their HIV status [9]. More than 75% of MSM in low and middle income countries lack access to HIV testing services [10]. It is estimated that new HIV infections could be reduced by 30% per year, if all HIV positive individuals were aware of their serological status [11]. World Health Organization (WHO) recommends that all MSM test for HIV at least annually and those MSM who have multiple or anonymous partners or use illegal drugs should test at least every 3 or 6 months [12]. There is therefore urgent need to develop and implement innovative initiatives that promote HIV testing, especially among the MSM community. Through the ambitious 90-90-90 global strategy, the United Nations Programme on HIV/AIDS (UNAIDS) advocates that at least 90% of people should know their HIV status, 90% of those diagnosed linked to anti-retroviral (ARV) treatment and 90% of those on treatment achieving viral suppression [13]. Achieving “the first 90%” is a critical step in the elimination of new infections by 2030 [14]. HIV self-testing (HIVST) involve a process where an individual collects their own specimen (oral fluid or blood), conducts a HIV test and interprets the result. Individuals can perform a HIV self-test in a private setting, either alone or with someone they trust. The Kenyan government introduced self-testing kits as part of “Be Self Sure campaign in May, 2017. The kits are now available to buy from pharmacies for around 8-10 United States Dollars (USD). Since HIV self-testing does not provide a definitive diagnosis, individuals whose tests positive for HIV are advised to seek confirmatory testing with a health provider, in line with the national HIV testing algorithm [15]. Recent research conducted in Zimbabwe, Zambia, Lesotho and Kenya revealed that HIVST is feasible, acceptable among health workers and the general population [16], [13], [17]. Generally, uptake of HIV Testing Services (HTS) among the MSM is low, compared to those in the general population due to barriers such as stigma, discrimination and poor quality of services [18] [19]. There is potential for HIVST to enhance access to HIV testing especially within the MSM community [20]. Innovative interventions geared towards promoting testing among the MSM community must overcome key barriers to testing such as stigma, fear about confidentiality of venue testing, distance to testing sites and opportunity cost [1]. Countries around the world are at different stages of development and implementation of HIVST guidelines. There is however no optimal approach for implementing HIVST targeting the MSM community. Very few studies have examined any aspect of HIVST among MSM in Sub-Saharan Africa [21], [22]. Kenya has conducted several studies to understand the feasibility of scaling up HIVST within the general population, including among sero-discordant couples and FSWs, yet there is little information on HIVST among MSM specifically [23], [24]. Although global evidence suggests that introduction of HIVST can benefit MSM, evidence is limited on how, when, and in what contexts the delivery of HIVST to MSM could increase awareness of HIV status, and lead to early linkage to HIV treatment and prevention services in the African context [25]. We conducted this research to explore acceptability and factors that would facilitate the uptake of HIVST among the MSM community in Nairobi.

Methods

Study Population

The study population was all adult men aged 18-60 years living in Nairobi, who self-reported having engaged in anal or oral sex with men. The age requirement for over 18 years intended to preclude any ethical issues surrounding the interviewing of MSM or MSW minors.

Population Size and Composition

Table 1, below gives the county population projections in 2017 based on the 2009 Kenya Population and Housing Census by age cohort and gender with an inter-censal growth rate of 3.8 per cent. In 2012, the county population was projected to be 3,517,325 and is expected to rise to 3,942,054 in 2015 and 4,253,330 in 2017.

Table 1: Population Projection by Age Cohorts 2017 (Projections)

Male Age cohort	Nairobi	Kiambu	Total
20-29	571,697	256,337	828,034
30-39	419,469	201,770	621,239
40-49	213,455	125,530	338,985
50-59	95,011	71,053	166,064
60-69	35,086	33,860	68,946
Total	1,334,718	688,550	2,023,268

Source: Kenya Bureau of Statistics, 2013

Sample size was determined using the modified Hayes (1999) formulae for two proportions. The sample size was determined to be able to pick a significant difference between characteristics of the groups at 95% confidence level. The precision with which the parameters were estimated was 5%. This calculator uses the following formula for the sample size n:

$$n = \frac{Z_{\alpha/2}^2 p(1-p)}{d^2}$$

Where

$Z_{\alpha/2}$ is the critical value of the Normal distribution at $\alpha/2$ (e.g. for a confidence level of 95%, α is 0.05 and the critical value is 1.96), e is the margin of error, p is the sample proportion, and N is the population size. Note that a finite population correction has been applied to the sample size formula.

The population of men in Nairobi and Kiambu County were projected that by the year 2017 will be at 2,023,268 (KBS, 2013). MSM population is also estimated at 10,000 (NASCO, 2013) which is the population of interest.

$$n = \frac{Z_{\alpha/2}^2 p(1-p)}{d^2}$$

Where

and $Z_{\alpha/2}$ is the critical value of the Normal distribution at $\alpha/2$ (e.g. for a confidence level of 95%, α is 0.05 and the critical value is 1.96), e is the margin of error, p is the sample proportion, and N is the population size. Note that a Finite Population Correction has been applied to the sample size formula.

$$n = \frac{1.96^2 0.182(1-0.182)}{0.038^2} = 396$$

The sample size for the study will be 396 respondents.

Sampling Technique

This exploratory study employed a cross-sectional design in peri-urban settings of Nairobi and Kiambu counties in Kenya. Identifying MSM and MSW in Nairobi was a daunting task because of the widespread stigmatization and criminalization of MSM behavior. We recruited a total of 391 MSM respondents to complete self-administered questionnaires, some of the respondents were men sex workers (MSW). Only 369 MSM completed the questionnaires (response rate = 94%) out of which 172 were MSW. Only self-reported MSM aged above 18 years of age were eligible to participate in this study. Since, the MSM and MSW community is a hidden population and difficult to reach, especially in Kenya where homosexuality is criminalized, we purposively sampled eleven data collection points from where the MSM frequent. The areas include the drop-in centers, bars, hotels and massage parlors. Snowballing was then employed to reach the respondents.

Data collection:

All the MSM respondents completed paper based self-administered structured questionnaires between July 2018-June 2019 after obtaining oral informed consent. These structured questionnaires consisted of three sections. The first section had questions on demographics of the respondents, the second section consisted of questions on HIV risk behaviors and the final sections had question on HIVST.

Data Analysis & Management

The questionnaires were serialized and data entered in a SPSS Version 23.0 data-base for analysis (IBM Corp, 2015). Using descriptive analysis, we summarized and presented data in tables. We cross tabulated data on factors associated with HIV self-test uptake among the MSM community. Further analysis of inferential statistics was conducted using Prevalence Odds Ratio (POR) and Prevalence Ratio (PR) tests. This estimated the contribution of each of the risk factors in the outcome of HIV self-test uptake among the MSM community.

Ethical Considerations

We ensured full compliance to the research ethics codes set out in the Helsinki Declaration. Ethical clearance was obtained from the University of Ghent Approval number (PA 2016/009) and the Mount Kenya University Ethics Review Committee (Approval number: MKU/ERC/0463). Informed consent was obtained from all study participants in a language that they could understand and were informed that their participation was voluntary. To ensure confidentiality, all potential identifiers in the data were omitted and each record was anonymized using unique identifiers during data entry and analysis. Access to the data was restricted to only those researchers responsible for analysis in password protected databases and computers. All investigators received extensive training on research ethics at the beginning of the study.

Results

The results are presented in two sections. The first table and sections contain the demographics, social-economic and HIV risk for the respondents, the second sections data on the results for HIVST.

Demographics, Socio-economic & HIV Risk characteristics of participants

The below data is available on (Table, 2) pages 10, 11.

The majority of respondents were Kenyans at (92.6%), followed by Ugandans at (4.0%), Democratic Republicans of Congo and Rwandans were equal at (1.1%) respectively, Tanzanians (0.6%), Cote D'Ivoire and Nigerians were distributed equally at (0.3%). A significant number of the respondents indicated that their income band was less than 60 USD at (49.3%), and USD 60 – 250 at (39.3%), with (9%) at USD 251 - 750 and (2.4%) at over USD 750. This means that 87% of the respondent's monthly income range between USD

0 – 250. Half of the respondents at (50%) of the respondents identified themselves as men sex workers (MSW). Most of the respondents were homosexual followed by bisexual. About sixty eight percent (68%) of the respondents were ever married to a man and (28%) had been ever married to a woman. A majority of the respondents indicated that they had multiple sexual partners at (39.9%), those who indicated that they had two sexual partners in the past six months were (33.6%), the respondents who indicated to have had only one sexual partner in the period were (21.1%) with (5.4%) of the respondents indicating that they had no sexual partner in the last six months. Most of the respondents were versatile, they preferred being either on top or bottom.

Table 2. Demographics, Socio-economic & HIV Risk characteristics of participants.

Country of birth		
	Frequency	Percent (%)
Kenya	323	92.6
Uganda	14	4.0
DRC	4	1.1
Rwanda	4	1.1
Tanzania	2	0.6
Nigeria	1	0.3
Cote D'Ivoire	1	0.3
Total	349	100.0
Education level		
	Frequency	Percent (%)
Never	5	1.4
Primary School	35	9.6
Secondary School	182	50.1
Tertiary	141	38.8
Total	363	100.0
Currently employed		
	Frequency	Percent (%)
No	203	63.0
Yes	119	37.0
Total	322	100.0
Monthly income		
	Frequency	Percent (%)
Less than 60 USD	104	49.3
60 – 250 USD	83	39.3
251 – 750 USD	19	9.0
750 + USD	5	2.4
Total	211	100.0
Identity MSW		
	Frequency	Percent (%)
No	172	50.0
Yes	172	50.0
Total	344	100.0
Sexual Orientation		
	Frequency	Percent (%)
Homosexual	228	66.3
Bisexual	95	27.6
Heterosexual	8	2.3
Other	13	3.8
Total	344	100.0
Marital status		
	Frequency	Percent (%)
Single	306	86.4
Widower	5	1.4
Married	29	8.2
Divorced/Separated	14	4.0
Total	354	100.0
If ever married		
	Frequency	Percent (%)
Man	57	68.7
Woman	24	28.9
Both Man and woman	2	2.4
Total	83	100.0
Number of Sexual partners last 6 months		
	Frequency	Percent (%)
One	74	21.1
Two	118	33.6
Multiple	140	39.9
None	19	5.4
Total	351	100.0
Use condom during sex		
	Frequency	Percent (%)
No	31	8.8
Yes	320	91.2
Total	351	100.0
Condom use frequency		
	Frequency	Percent (%)
Always	186	57.4
Most of the time	89	27.5
Sometimes	46	14.2
Never	3	0.9
Total	324	100.0
Prefer top or bottom		

	Frequency	Percent (%)
Top	132	37.9
Bottom	73	21.0
Both/versatile	143	41.1
Total	348	100.0
Frequency of condom use during anal sex after alcohol/hard drug use		
	Frequency	Percent (%)
Always	158	51.6
Most of the time	58	19.0
Some times	49	16.0
Never	41	13.4
Total	306	100.0

The below results on current status on HIV/AIDS & Sexually transmitted infections (STI) screening, HIV self-test acceptability uptake, preferences and HIVST uptake facilitators & barriers have been presented in Table 3, page 27 of this paper.

Table 3 Results on HIVST Acceptability, Uptake, Facilitators and Barriers

			Used HIV test kit before.		Total	Chi-Square Tests	Risk Estimate			
			No	Yes		P-Value	Value	95% Confidence Interval		
								Lower	Upper	
Ever tested for HIV/AIDs	No		12 (66.6)	6 (33.3)	18 (5)	0.227	Prevalence Odds Ratio for Ever tested for HIV/AIDs (No / Yes) For cohort Used HIV test kit before = No	1.733	0.636	4.721
	Yes	n (%)	187 (53.6)	162(46.4)	349 (95)			1.244	0.885	1.75
Total		n (%)	199 (54.2)	168 (45.8)	367		For cohort Used HIV test kit before = Yes	0.718	0.37	1.394
If yes how often do you test for HIV/AIDS	Every 3 months	n (%)	122 (49.6)	124 (50.4)	246(67)	0.011	Prevalence Odds Ratio for If yes how often do you test for HIV/AIDS (Every 3 months / Greater than 3 months) For cohort Used HIV test kit before = No	0.562	0.36	0.879
	Greater than 3 months	n (%)	77(63.6)	44 (36.4)	121(33)			0.779	0.648	0.937
Total		n (%)	199 (54.2)	168(45.8)	367		For cohort Used HIV test kit before = Yes	1.386	1.062	1.809
Results of the most recent HIV test	Negative	n (%)	146 (52.1)	134 (47.9)	280 (76)	0.151	Prevalence Odds Ratio for Results of the most recent HIV test (Negative / Positive) For cohort Used HIV test kit before = No	0.699	0.428	1.141
	Positive	n (%)	53 (60.9)	34 (39.1)	87 (24)			0.856	0.699	1.048
Total		n (%)	199 (54.2)	168 (45.8)	367		For cohort Used HIV test kit before = Yes	1.225	0.917	1.636
Ever heard of window period	No	n (%)	111 (57.5)	82 (42.5)	193 (53)	0.183	Prevalence Odds Ratio for Ever heard of window period (No / Yes) For cohort Used HIV test kit before = No	1.323	0.876	1.997
	Yes	n (%)	88 (50.6)	86 (49.4)	174 (47)			1.137	0.94	1.376
Total		n (%)	199 (54.2)	168 (45.8)	367		For cohort Used HIV test kit before = Yes	0.86	0.688	1.074
If yes considered window period in deciding when to test	No	n (%)	116 (58.6)	82 (41.4)	198 (54)	0.069	Prevalence Odds Ratio for If yes considered window period in deciding when to test (No / Yes) For cohort Used HIV test kit before = No	1.466	0.969	2.216
	Yes	n (%)	83 (49.1)	86 (50.9)	169 (46)			1.193	0.983	1.447
Total		n (%)	199 (54.2)	168 (45.8)	367		For cohort Used HIV test kit before = Yes	0.814	0.652	1.016
Frequency of STI screening	0- 3 months	n (%)	141 (50.4)	139 (49.6)	280 (77)	0.005				
	Over 3 months	n (%)	58 (67.4)	28 (32.6)	86 (23)					
Total		n (%)	199 (54.4)	167 (45.6)	366					
Consider taking up HIV self-test as one of the HIV combination prevention strategy	No	n (%)	53 (60.9)	34 (39.1)	87 (24)	0.151	Prevalence Odds Ratio for Consider taking up HIV self-test as one of the HIV combination prevention strategy (No / Yes) For cohort Used HIV test kit before = No	1.431	0.876	2.336
	Yes	n (%)	146 (52.1)	134 (47.9)	280 (76)			1.168	0.954	1.43
Total		n (%)	199 (54.2)	168 (45.8)	367		For cohort Used HIV test kit before = Yes	0.817	0.611	1.091
If HIV positive through HIV self-test, would you go for a confirmatory test	No	n (%)	42 (56.0)	33 (44.0)	75 (20)	0.031	Prevalence Odds Ratio for Consider taking up HIV self-test as one of the HIV combination prevention strategy (No / Yes) For cohort Used HIV test kit before = No	0.562	0.36	0.879
	Yes	n (%)	157 (53.8)	135 (46.2)	292 (80)			0.779	0.648	0.937
Total		n (%)	199 (54.2)	168 (45.8)	367		For cohort Used HIV test kit before = Yes	1.386	1.062	1.809
If yes after how long would you go for a confirmatory test	One month or less	n (%)	182 (54.8)	150 (45.2)	332 (92)	0.898	Prevalence Odds Ratio for If yes after how long would you go for a confirmatory test (One month or less / Won't go) For cohort Used HIV test kit before = No	1.052	0.485	2.279
	Won't go	n (%)	15 (53.6)	13 (46.4)	28 (8)			1.023	0.715	1.464
Total		n (%)	197 (54.7)	163 (45.3)	360		For cohort Used HIV test kit before = Yes	0.973	0.643	1.474
If you test positive would you use protection or condoms with your partner	No	n (%)	36 (69.2)	16 (30.8)	52 (14)	0.019	Prevalence Odds Ratio for If you test positive would you use protection or condoms with your partner (No / Yes) For cohort Used HIV test kit before = No	2.098	1.119	3.936
	Yes	n (%)	163 (51.7)	152 (48.3)	315 (86)			1.338	1.084	1.651
Total		n (%)	199 (54.2)	168 (45.8)	367		For cohort Used HIV test kit before = Yes	0.638	0.418	0.974
Would go for counselling after positive result	No	n (%)	115 (58.1)	83 (41.9)	198 (54)	0.108	Prevalence Odds Ratio for Would go for counselling after positive result (No / Yes) For cohort Used HIV test kit before = No	1.402	0.928	2.119
	Yes	n (%)	84 (49.7)	85 (50.3)	169 (46)			1.169	0.964	1.416
Total		n (%)	199 (54.2)	168 (45.8)	367		For cohort Used HIV test kit before = Yes	0.833	0.667	1.041

If negative test result would you use condoms with your partner	No	n (%)	29 (69.0)	13 (31)	42 (11)	0.04	Prevalence Odds Ratio for If negative test result would you use condoms with your partner (No / Yes)	2.034	1.021	4.053
	Yes	n (%)	170 (52.3)	155 (47.7)	325 (89)		For cohort Used HIV test kit before = No	1.32	1.051	1.657
Total		n (%)	199 (54.2)	168 (45.8)	367		For cohort Used HIV test kit before = Yes	0.649	0.407	1.034
Ever heard of HIV self-test	No	n (%)	89 (65.4)	47 (34.6)	136 (37)	0.001	Prevalence Odds Ratio for Ever heard of HIV self-test (No / Yes)	2.083	1.345	3.227
	Yes	n (%)	110 (47.6)	121 (52.4)	231 (63)		For cohort Used HIV test kit before = No	1.374	1.145	1.649
Total		n (%)	199 (54.2)	168 (45.8)	367		For cohort Used HIV test kit before = Yes	0.66	0.508	0.857
Ever heard of oral HIV Self-test	No	n (%)	107 (66.0)	55 (34.0)	162 (44)	<0.0001	Prevalence Odds Ratio for Ever heard of oral HIV Self-test (No / Yes)	2.39	1.561	3.659
	Yes	n (%)	92 (44.9)	113 (55.1)	205 (56)		For cohort Used HIV test kit before = No	1.472	1.22	1.776
Total		n (%)	199 (54.2)	168 (45.8)	367		For cohort Used HIV test kit before = Yes	0.616	0.481	0.789
Ever heard of blood sample HIV Self-test	No	n (%)	83 (76.9)	25 (23.1)	108 (29)	<0.0001	Prevalence Odds Ratio for Heard of blood sample HIV Self-test (No / Yes)	4.093	2.458	6.814
	Yes	n (%)	116 (44.8)	143 (55.2)	259 (71)		For cohort Used HIV test kit before = No	1.716	1.447	2.034
Total		n (%)	199 (54.2)	168 (45.8)	367		For cohort Used HIV test kit before = Yes	0.419	0.292	0.601
Would prefer to use the Oral or Blood self-test kit	Oral self-test kit	n (%)	77 (61.1)	49 (38.9)	126 (41)	0.039	Prevalence Odds Ratio for Would prefer to use the Oral or Blood self-test kit (Oral self-test kit / Blood self-test kit)	1.624	1.024	2.578
	Blood self-test kit	n (%)	89 (49.2)	92 (50.8)	181 (59)		For cohort Used HIV test kit before = No	1.243	1.014	1.523
Total		n (%)	166 (54.1)	141 (45.9)	307		For cohort Used HIV test kit before = Yes	0.765	0.589	0.994
Preference point of picking the oral HIV self-test kit /distribution	Private	n (%)	43(58.1)	31 (41.9)	74(23.1)	0.196				
	Government	n (%)	33(47.1)	37(52.9)	70 (21.9)					
	NGO	n (%)	90(53.3)	79 (46.7)	169 (52.8)					
	Internet	n (%)	6 (85.7)	1 (14.3)	7(2.2)					
Total		n (%)	172 (53.8)	148(46.3)	320					
If using self-test for the first time would you prefer to have a testing "buddy"	No	n (%)	27 (54)	23 (46)	50 (15.3)	0.557				
	Yes	n (%)	149(54)	127 (46)	276 (84.4)					
	Not applicable	n (%)	0	1 ()	1 (0.3)					
Total		n (%)	176 (53.8)	151 (46.2)	327					
Organization of preference to provide Test kit Hotline	Public		50 (55%)	41(45%)	91 (29%)	0.941				
	Drop in Centre		77 (54%)	65(46%)	142(45%)					
	Private hospitals		40 (53%)	35 (47%)	75(24%)					
What would prevent you from using the HIV oral test kit	Not available		22 (46%)	26 (54%)	48 (15%)	0.600				
	Cost		64 (62%)	40 (38%)	104 (33%)					
	Lack of knowledge		51 (51%)	49 (49%)	100 (32%)					
	Fear		20 (47%)	23 (53%)	43 (14%)					
	Other		4 (80%)	1 (20%)	5 (1.6%)					
	Cost & Fear		1 (50%)	1 (50%)	2 (0.6%)					
	Lack of knowledge		2 (67%)	1 (33%)	3 (1%)					
	Total		168 (54%)	143 (46%)	311					
What do you think of the current cost	Affordable	n (%)	107 (69.0)	48 (31)	155 (42)	<0.0001	Prevalence Odds Ratio for What do you think of the current cost (Affordable / Expensive)	2.908	1.881	4.495
	Expensive	n (%)	92 (43.4)	120 (56.6)	212 (58)		For cohort Used HIV test kit before = No	1.591	1.32	1.917
Total		n (%)	199 (54.2)	168 (45.8)	367		For cohort Used HIV test kit before = Yes	0.547	0.421	0.712

Current status on HIV/AIDS & STI screening.

Among the MSM who have ever tested for HIV/AIDS, 246 (67%) of respondents had tested for HIV within 3 months retesting frequency and were the majority, while the respondents with more than 3 months retest at 121 (33%) with 44 (36.4%) having used self-test. There was a significant Chi-Square association between self-test and frequency of testing for HIV/AIDS

P-Value = 0.011. The respondents with testing frequency greater than 3 months were 1.386 times as likely to test using a HIV self-test kit before. Result on the most recent HIV test showed that seventy six percent of the respondents (76%) 280 of the respondents had a negative result, 87 (24%) had a positive result from the last result. Among the clients who tested negative 134 (47.9%), had used HIV self-test kits and among those who tested positive 34 (39%) had also used HIV self-test kits. Fifty four percent of the respondents (54%) 198 indicated that they did not consider window period when testing. The respondents who indicated that they screen for STI after 0-3 months were the majority at 280 (77%), over three months were at 86 (23%) of the respondents. There was a statistically significant Chi-Square dependency between respondents who had ever used a HIV self-test kit and the respondents STI screening frequency at P. Value =0.005. The respondents whose STI screening frequency was over three months was at 1.525 times likely to test using a HIV self-test kit.

HIV self-test acceptability, uptake & preferences

A significantly high population of the MSM at 76% considers HIV self-test as one of the HIV prevention combination prevention strategies with (47.9%) having used HIV self-test kits. The interviewees who had ever heard of HIV self-test were 231 (63%) with 121(52%) indicating that they had used the HIV self-test kit. There was a statistically significant Chi- Square association between HIV self-test kit use and the respondents who had ever heard of a HIV self-test kit at P. Value = 0.001. The respondents who had ever heard of a HIV self-test kit were 1.374 times likely to test using a HIV self-test kit. The respondents who had ever heard of oral HIV self-test 205 (56.0%) with 113 (55.1%) of this respondent who had used a HIV self-test kit. There was a statistically significant Chi-Square association between respondents who had ever used a HIV self-test kit and the respondents who had ever heard of an oral HIV self-test kit at P. Value = 0.0001. The respondents who had ever heard of oral HIV self-test kit were 1.472 times likely to test using a HIV self-test kit. The respondents who had ever heard of blood sample HIV self-test were 259 (71%) with 143 (55.2%) of this respondent who had used a HIV self-test kit. There was a statistically significant Chi-Square association between respondents who had ever used a HIV self-test kit and the respondents who had ever heard of a blood sample HIV self-test kit at P-Value <0.0001. The respondents who had ever heard of blood sample HIV self-test kit were 1.716 times likely to test using a HIV self-test kit. About fifty nine percent (59%) 181 of the respondents indicated that they would prefer a blood self-test kit with 89 (49%) of the respondents having used the self-test kit. About forty one percent (41%) 126 of the respondents of the respondents indicated that they would prefer an oral self-test kit with 141 (45.9%) of the respondents having used either self-test kit. There was a statistically significant Chi-Square association between respondents who had ever used a HIV self-test kit and the respondent's preference to use either the oral or blood self-test kit at P. Value =0.039. The respondents who would prefer to use the oral or blood self-test.

A high proportion of the respondents at 292 (80%) indicated that if they tested HIV positive through HIV self-test, they would go for a confirmatory test and among this respondent 135 (46.2%) had used a self-test kit, 75 (20%) indicated they would not go for a confirmatory test. There was a significant Chi-Square association between going for a confirmatory test if tested HIV positive through HIV self-test at P. Value =0.031. The respondents who would go for a confirmatory test if tested HIV positive through HIV self-test were 1.386 times as likely to test using a using a HIV self-test kit. About (92%) 332 indicated that they would go for a confirmatory test after within a month while 28 (8%) indicated they would not go to confirm the test. A number of the respondents indicated that they would go for counselling after positive results at 169 (46%) with 85 (50.3%) among the respondents having used a self-test kit. Eighty nine percent (89%) 325 of the respondents agreed that they would use condom with their partners despite a negative HIV test result and 155 (47.7%) indicated that they had used a HIV self-test kit. There was a statistically significant Chi-Square relationship between HIV self-test kit use and the respondent's condom use with partners even after a negative HIV test result at P. Value =0.040. The respondents who tested negative and who would use condoms with their partner were 1.338 times as likely to test using a HIV self-test kit. Eighty six percent (86%) 315 of the respondents indicated that they would use protection/condom after a positive test with the partner and among them 152 (48.3%) had used a self-test kit. There was a statistically significant relationship between self-test kit use and the respondent's protection/ condom use after a positive test with their partners at P. Value =0.019. The respondents who use protection or condoms with their partners were 1.338 times as likely to test use a HIV self-test kit. A majority of the respondents at 169 (52.8%) indicated that they would prefer NGO facility/drop in center's as distribution point, 70 (21.9%) indicated they would prefer to pick the test kits from the nearest government facility, 36 (11.6%) indicated that their point of preference to pick the kits to be Private hospital/Private clinic, the respondents who indicated that they would prefer to pick the kits from a retail or community pharmacy were 34 (10.9%). About (45%) 142 of the respondents indicated that they would prefer the hotline to be handled by a drop in centre, and 91(29%) indicated that they would prefer the information from the hotline relayed from a public hospital.

HIVST uptake facilitators & barriers

About sixty seven percent (67%) 207 of the respondents indicated that they would prefer a "testing buddy" on the first time of self-test kit use with 108 (52%) of the respondents having used the self-test kit. There was a statistically significant Chi-Square association between respondents who had never used a HIV self-test kit and the respondents need of a treatment partner on first time use of HIV self-test kit at P. Value =0.014. Thirty three percent (33%) 104 of the respondents indicated that cost would prevent them from using the HIV oral self-test kit with 40 (38%) of the respondents having used a HIV self-test kit. Thirty two percent (32%) indicated that lack of knowledge would prevent them from HIV oral self. Inaccessibility and fear of the results were also some of the other reasons that were mentioned. Twenty nine percent (29%) 89 of the respondents indicated that cost would prevent them from using the HIV blood sample self-test kit with 27 (30%) of the respondents having used a HIV self-test kit. Lack of knowledge of how to use the kits, fear of the results and inaccessibility of the kits were some of the other reasons that would hinder the respondents from using the blood sample test kits. About sixty two percent of the respondents indicated that the estimated current market cost of the self-test kit was expensive with 120 (56.6%) having used the self-test kit. There was a statistically significant Chi-Square relationship between cost of the test kits and use at a P- Value <0.0001. The respondents who thought that the current cost was expensive were 1.591 times not likely to test using a HIV self-test kit.

Discussion

This study majored on HIVST among MSM and MSW in Nairobi and the peri-urban areas neighboring. The findings of this study significantly contributes to WHO's 2016 guidelines on HIVST that calls for further evidence on HIVST within the MSM community in Kenya [26].

The study explicitly shows there is a significant association between HIV self-test and frequency of testing. MSM who used HIV self-test kits had a higher frequency of testing. Our findings are in concurrence with MSM randomized to HIVST access Vs. standard clinic-based testing in Seattle, the mean number of HIV test and quarterly testing increased significantly among those in the HIVST, with no increase in risk behaviors [27]. The study demonstrated that access to HIV self-testing at no cost increased testing frequency among high-risk MSM in Seattle and had no effect on STI acquisition or sexual risk behaviors. Kenya's National HIV testing guidelines recommends re-testing of HIV negative MSM every three months [28]. To achieve the above target, both clinic-based setting and HIV self-test options should be scaled up within the MSM community. Our study findings show that most of the MSM preferred blood sample self-test kits as compared to oral self-test kits. These findings are in line with a study conducted in South Africa among the MSM community that showed higher preference for fingerstick tests over oral fluid tests among the participants [21]. Our findings differ from study findings conducted in the US emergency department, where most of the respondents preferred oral fluid testing [29]. Given the diversity of preference for either blood sample or oral test kits and the overwhelming support for HIVST, we would highly recommend the availability and distribution of both types of self kits to the MSM in Kenya.

A high proportion of the respondents at (80%) indicated that if they tested for HIV positive through HIV self-test, they would go for counselling and confirmatory test. Our findings are consistent with findings from a cross-sectional study done in Kenya, that showed that 74% of the respondents would seek counselling services, confirm results or seek medication after a positive HIVST [30]. Pre-test counselling should be offered before dispensing the HIV self-test. This would provide an opportunity for client to get all the information they would need before testing. The provision of information before testing would be crucial in guiding the clients on how to use the test kits, so as to reduce invalid results also the clients would know what to do depending on the results and where to seek for the healthcare services. Pre-test counseling data can also be used for monitoring the patients and for follow-ups. The respondents would prefer the hotlines or helplines to be handled by a drop-in center and the public hospital. A study done with a cohort of MSM in Nigeria showed less usage of the hotline or helpline. A low number of the participants called through the helpline. This was expected, since most the respondents found the instructions easy to use to understand and use [31]. Other studies have also shown significantly low usage of the hotlines [32] [24]. Though the hotlines or helplines showed less usage, they should be retained in helping to reach out and provide more information on the use of HIV self-test kits and link MSM to the health care systems.

A major concern for HIVST is whether self-testers will seek care and treatment depending on the results. Linkage to HIV care is seen as accessing a health care provider through a clinic at different stages, the stages include i) enrolment into care and treatment after diagnosis, ii) determination of antiretroviral therapy eligibility, iii) initiation of ART and iv) ART adherence [33]. Being able to link to care within a week is considered optimal behavior given that linkage to care is defined as "having visited a health care provider within 30 days of being diagnosed with HIV [34]. A significantly high proportion of the respondents at (92%) would go for confirmatory test within one month of testing. Our findings are slightly higher than a study conducted in Kenya in 2014, [30] that reported 61% of the general population sampled and 40 % of MSM would go to a clinic for a confirmatory test. This demonstrates that the MSM who self-test are willing and will still link to the healthcare system. During the implementation of HIV self-test, the following mixed approaches can be considered in linking the MSM to the healthcare services. Home visits by the healthcare workers, MSM visiting MSM friendly clinics, calls and short message service (SMS) since it's a very mobile sub-population. SMS was the least preferred, since it limits someone from expressing their concerns, feelings and it was difficult to establish a relationship. Most of the respondents felt it was important for them to be able to express their concerns and feelings after receiving a positive result. This would be very difficult using the short message service. Scientific evidence indicates that being sick is a strong determinant to linkage to care as one seeks medical attention [33]. Hence the MSM who feel generally "healthy" though sero-positive but with no sign and symptoms are likely not to link to care. A study conducted in Nigeria among the MSM community showed a 100% linkage to HIV and treatment [31]. The high linkage in that study was likely due to follow-up calls after HIVST distribution, the ease of participant's access to the opinion leaders and also the linkage to a well-trusted MSM-friendly facility that offers HIV prevention services. Studies conducted in other areas reported both fairly low [35] and high [36] linkage to HIV care and treatment after self-testing.

The NGO facilities/drop in centres were the most preferred distribution points for the HIV self- test kits. Other distribution points include the private sector and the public/government facilities.

Our findings differ slightly with a study conducted by Okal et al., [30], that's showed that most of the respondents preferred public health care facilities but for the general population. The variance in the findings can be attributed to the fact that the MSM community feel stigmatized and also due to the illegal nature of homosexuality in Kenya, hence the MSM would want to stay far away from the public/Government healthcare providers. Site preference is also largely based on proximity and cost. A study conducted within the general adult population showed that "easily available" as the strongest reason for which ever pick up point [16]. A research conducted in Nigeria affirms the above preference of the MSM to pick the kits from the MSM friendly drop in centers, a high percentage (42.2%) chose to go to the community health clinic (CHC) for the HIVST kits [22]. Future HIVST distribution should consider drop in centers and community pharmacies as options of distribution sites. Peer educators or Key Opinion Leaders (KOL) are still an option to be considered, though this approach would have high cost implications.

A significantly high number of MSM indicated that they would prefer a testing "buddy" on the first time of self-test kit use. There was a statistically significant association between respondents who had never used a HIV self-test kit and the respondents need of a treatment partner on first time use of HIV self-test kit. In the year 2013, Kenya conducted the first HIVST validation studies that reported a higher rate of invalid HIV results (37/ 239 = 15.5%) [16]. The findings are also consistent with another study done among Chinese MSM, that showed significant errors during the process of conducting HIVST that rendered almost half of the test results invalid [37]. According to that study, failure to follow the manufacturers instructions was the main cause of invalid results both for oral self test and blood sample test kits. For the finger prick users, most of the errors occurred during the stage of collecting specimen and for oral fluid users made most of the errors during the stage of testing the collected specimen. A treatment partner or "buddy" should be advocated for in helping the MSM first time testers get accurate results. The above findings explicitly demonstrate the need for assisted testing for first time users to reduce the invalid tests and also the need for hotlines which are accessible 24 hours and are trusted and friendly to the MSM community to be able to seek help. Further to this, MSM should be encouraged and awareness created for anyone who gets an invalid result to immediately seek confirmatory test.

The high cost of the test kits, lack of knowledge on correct usage of the test kits, fear, stigma and inaccessibility of HIV self-test kits were the main hindrances on the use of the kits. Most of the respondents indicated that the estimated current market cost of the self-test kit was expensive at 8-100 USD. The preferred cost of the HIVST kit was about half to one USD. Lack of appropriate knowledge on the use of HIVST kits would prevent the MSM from using the kits. This correlates to studies showing several ways in which errors would happen, this would include during sample collection using the swab, also the handling of the swab and following the procedures [38], [16].

This study has some limitations. Despite the fact that the respondents, were recruited through methods designed to generate a representative sample, the sample is unlikely representative of all MSM in Kenya, since most of the respondents were young and of low and medium economic status. Demonstrating that the older and MSM with higher economic status were not represented. The respondents were also drawn from Nairobi and the neighboring county, where the MSM community has been receiving considerable support from the NGOs as compared to MSM in other regions of the country. Future studies should prioritize the elder generations and also the MSM with higher income status and also from other regions of the country with few HIV prevention interventions.

Conclusions

HIVST in Kenya will significantly contribute to the first United Nations 90-90-90 targets as many MSM remain unaware of their HIV sero-status [39]. A significant high proportion of the MSM consider HIV self-test as one of the HIV combination prevention strategies and are willing to be take-up HIVST. Most of the MSM are willing to seek for care within 30 days of self-testing. This is a good indicator for linkage to care and treatment after self-test. Some of the key facilitating factors for HIVST uptake among the MSM community in Kenya include; awareness creation on the importance of frequent HIV testing, sensitization on the importance of considering window period during testing, advocacy on the importance of confirmatory test after HIVST, counselling pre and/ or post testing, emphasizing the importance of testing buddies for first-time testers and reducing the cost of the current HIV self-test kits. Blood sample test kits are more preferred than Oral test kits. Phone calls should be considered as a priority strategy for reach out to the MSM community and for linking them to care & treatment after HIV self-test. Future studies should explore HIVST among the elder generations and MSM with higher economic status. Other studies should explore linkage to care and treatment of the MSM receiving the kits from the different distribution channels.

Abbreviations

ART	Antiretroviral Therapy
AIDS	Acquired Immunodeficiency Syndrome
HIV	Human Immunodeficiency Virus
HIVST	Human Immunodeficiency Virus self -test
MSM	Men who have sex with men
MSW	Pre-exposure prophylaxis
PEP	Post exposure prophylaxis
PrEP	Pre-exposure prophylaxis

Declarations

Ethics approval and consent to participate

Clearance for the study was obtained from Ghent University PA 2016/009 and Mount Kenya University Ref. No. MKU/ERC/0463. Verbal informed consent was sought before the interviews due to the illegal nature of homosexuality in Kenya and was approved by the ethics committee.

Consent for publication

Not applicable

Availability of data and materials

The datasets supporting the conclusions of this article are included within the article and its additional files. The attached questionnaire was developed purposely for this study.

Competing interests

The author declares no competing interests.

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Authors' contributions

All authors made significant contribution in the conceptualization and design of this study.

KN was responsible for the formulation of the study, conducting data collection, analyzing and developing the paper. GP and TM reviewed the paper and provided technical advice. All authors read and approved the final manuscript.

Disclaimer

The views and opinions expressed herein belong to the authors alone.

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