

UCSF

UC San Francisco Previously Published Works

Title

There is no need to leave the beach to test: a qualitative study of HIV self-testing knowledge and acceptability of HIV self-test kit distribution among social networks of fishermen in Western Kenya.

Permalink

<https://escholarship.org/uc/item/1qq5k5w3>

Journal

BMC International Health and Human Rights, 25(1)

Authors

Lewis-Kulzer, Jayne

Olugo, Phoebe

Gutin, Sarah

et al.

Publication Date

2025-03-14

DOI

10.1186/s12889-025-22136-1

Peer reviewed

RESEARCH

Open Access



“There is no need to leave the beach to test”: a qualitative study of HIV self-testing knowledge and acceptability of HIV self- test kit distribution among social networks of fishermen in Western Kenya

Jayne Lewis-Kulzer¹, Phoebe Olugo², Sarah A. Gutin^{3,4}, Zachary A. Kwen⁵, Holly Nishimura⁴, Marguerite Thorp⁶, Kawango Agot^{2^}, Benard Ayieko², Elizabeth A. Bukusi⁵, Lennah Oluoch², David Angawa², Harsha Thirumurthy⁷ and Carol S. Camlin^{1,4*}

Abstract

Background HIV self-testing (HIVST) can improve HIV testing uptake by offering convenience and privacy. Yet HIVST accessibility and uptake remain limited in Lake Victoria beach communities where HIVST holds promise to address many barriers highly mobile populations of men in fishing communities face. We assessed HIVST knowledge and acceptability among highly mobile fishermen, a high priority population for HIV prevention and treatment, participating in a social network-based study (“Owete”; NCT04772469) to promote HIV testing, prevention, and treatment in Kenya.

Methods Sixty-five in-depth baseline interviews (IDIs) and two focus group discussions (FGDs) were conducted at study baseline from December 2021 to June 2022 with fishermen, including 30 who were social network-central men recruited as HIVST “promoters” from three fishing communities along Lake Victoria, Kenya. Fishermen were purposively-sampled based on study arm, community, and age (18–34 and 35+) for interviews exploring HIVST knowledge, perceived benefits, and concerns. IDIs and FGDs were audio-recorded, translated/transcribed into English and inductively-coded and analyzed by six researchers using a framework approach.

Results Nearly all participants had heard about HIVST and expressed willingness to self-test. Almost half reported learning about HIVST for the first time through the Owete study. Perceived benefits of self-testing included privacy, convenience, and being able to learn one’s status with the freedom to choose when and where to test, which minimized stigma and work interruptions. Few participants had used HIVST prior to joining Owete, all of whom reported ease of use. Potential barriers to HIVST included fear of HIV-seropositive results, feeling unsure about how to

Co-author Dr. Kawango Agot passed away in August 2024.

*Correspondence:

Carol S. Camlin
carol.camlin@ucsf.edu

Full list of author information is available at the end of the article



© The Author(s) 2025. **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

use HIVSTs, and fear of stigma if a HIVST was discovered. Nearly all Owete promoters indicated willingness to distribute HIVST to help their peers know their status. Promoters stressed the importance of approaching HIVST discussions strategically and thoughtfully to garner trust and engagement, and felt they needed training to answer HIVST questions.

Conclusion While few fishermen had ever used HIVST, this study found high awareness, positive perceptions, and substantial willingness to use and distribute HIVST to other men. The “promoter” model, with known peers engaged in disseminating HIVST information and test kits, shows promise for engaging men in testing.

Keywords HIV self-testing, Prevention, Fishermen, Peer approaches, sub-Saharan Africa, Kenya

Introduction

While sub-Saharan African (SSA) nations have made great progress towards the Joint United Nations Programme on HIV/AIDS (UNAIDS) 95-95-95 targets, men’s engagement in HIV testing, prevention, and treatment remains suboptimal in many settings in the region. Twenty-one percent of men living with HIV in SSA in 2020 were unaware of their HIV status [1, 2]. Learning one’s HIV status through testing is the first step in the cascade to HIV prevention and treatment [3]. Yet, in SSA men lag substantially behind women in HIV testing [4, 5]. In Kenya, in 2018, a significantly lower proportion of men had ever tested for HIV compared to women (70.7% men vs. 85.1% women) and fewer men than women know their HIV status (72.6% men vs. 82.7% women) [5]. Lower HIV testing among men hinders their ability to access HIV prevention, treatment and to become virally suppressed.

Men face many barriers to facility-based HIV testing including difficulty accessing HIV testing services at fixed location clinics because of work-related travel or work schedules that make clinic attendance difficult [6–9]. These barriers can be exacerbated by norms of masculinity that value strength and see HIV testing or seeking care as weakness [6, 10, 11] and by stigma associated with clinic attendance [8, 12, 13]. In addition, men may view clinics as female spaces where the focus is on women’s reproductive health and infant and child health [4, 14, 15]. Men have also been found to infer their HIV status from their female partners who have tested [16].

The Lake Victoria region is a high HIV burden region with the highest HIV prevalence in Kenya, ranging from 10.38 to 16.18%, compared to a national adult HIV prevalence of 3.2% [17, 18]. Fisherfolk living around Lake Victoria are a priority population contributing to the high HIV prevalence in the region and in need of improved HIV testing, prevention, and care services [19, 20]. The highly mobile lifestyle of fishermen moving from beach to beach in search of good fish [6, 9], their engagement in higher-risk sexual behaviors, including a transactional “sex for fish” economy embedded in the fishing trade [21–26] and poor HIV care engagement [6, 8, 9] are factors that contribute to the higher HIV prevalence.

HIV self-testing is a relatively new approach that may be preferable for fishermen and other priority populations, it enables individuals to conveniently self-conduct a rapid antibody test (gum swab) with results in 20 min, it can be conducted at a time and place of the user’s choice, and results can be kept private [27–29]. In SSA, various approaches for distribution of HIV self-testing kits for men have shown promise, including through peers [30–32], female partners [33] and community-based distributors [34–38]. Research using social network influence to distribute HIV self-testing kits among highly mobile fishermen has not been previously studied. In the Owete Study, social network-central male peers were trained to distribute HIV self-testing kits to men in their close social networks. In this baseline qualitative study, we assessed HIV self-testing knowledge and acceptability among highly mobile fishermen in communities along Lake Victoria, Kenya.

Methods

Parent study

This qualitative study was embedded in a large cluster randomized controlled trial, the “Owete” (“Brothers” in Dholuo) study (NCT#04772469) [39]. The Owete study evaluated the effectiveness of a HIV status-neutral, social network-based approach combining behavioral and biomedical strategies to increase HIV testing uptake and linkage and adherence to prevention and care services among highly mobile male fishermen [39]. The study team conducted a census of men working in the fishing industry in three beach communities in Siaya County using Beach Management Unit registries of fishermen. The study then conducted a full sociometric survey of the male social networks of men in the registries. Men who were identified by their peers as highly socially-connected individuals were selected as network-central men (“promoters”) in this study. The role of promoters in this study was to empower them with knowledge and skills around self-testing and linkage to encourage peers in their social networks to test for HIV and link to health facilities for prevention and treatment [40]. Promoters and their close social network clusters were then randomized in clusters to intervention or control arms.

Promoters in both arms participated in one day of basic training on HIV prevention and treatment, while promoters in the intervention arm participated in a second day of training on HIV self-testing kit use and interactive sessions on peer communication and linkage to facilities [40]. After promoter training, promoters in the control arm received non-monetary referral vouchers to distribute to their social network members for routine HIV testing at a health facility. Promoters in the intervention arm received HIVST kits for distribution to their social network members, along with incentive vouchers for Kenyan Shilling (KSHS) 500 (about US Dollar [USD] \$3.50) to facilitate health facility linkage following HIV self-testing use. Owete collected baseline, 3-month and 6-month quantitative and qualitative data, this study is focused on baseline qualitative findings, which occurred prior to promoter training and study intervention.

Study setting and population

The Owete study took place in Siaya County along the shores of Lake Victoria in western Kenya. This setting was ideal due to its prominence as a hub for fishing activities, supporting a population of 993,183 individuals as of 2019 [41]. The county is one of the top high HIV burden counties, with over 1,500 new cases of HIV per year, and it has the third highest HIV prevalence in the country at 14.06%, surpassing the national average of 3.2% [17, 18]; prevalence was 28.9% in those aged 25–49 years in Siaya [42]. HIV testing and viral suppression rates have been higher than national levels, reflecting the nation's intensified epidemic control efforts to identify and link individuals to prevention and care in high prevalence areas [43], yet are below the UNAIDS 95-95-95 goals, particularly among men: in 2018, self-reported HIV testing in the last 12 months was 70.4% in Siaya (64.3% of men and 76.2% of women) and viral suppression was 78.7% in Siaya (66.3% among men and 84.4% among women living with HIV) [44, 45].

Sampling and recruitment

Qualitative study participants were purposively sampled from the population of men participating in the Owete trial, selected for heterogeneity across the groupings of age (18–34 and 35+), beach community, study arm, and promoter versus social network cluster member categories and provided informed written consent to participate. The selected fishermen were recruited from December 2021 to June 2022 and participated in baseline qualitative activities prior to the study intervention. Research team members trained in qualitative research techniques conducted a total of 65 in-depth interviews (IDIs) and two focus group discussions (FGDs) comprising 8–12 participants each.

Data collection

IDIs and FGDs were carried out by four trained research assistants proficient in the participants' preferred languages, Dholuo or Swahili. The IDIs and FGDs were conducted within a month of the main trial's enrollment consenting process and quantitative baseline survey administration at each beach. The consent process and survey introduced the HIV self-testing, however no community or peer sensitization or distribution of HIV self-testing was carried out prior the baseline IDIs and FGDs. The consenting process, IDIs, and FGDs were conducted in a private location to assure confidentiality. The FGD participants were assigned numbers for use during the discussions instead of their names to further protect confidentiality. IDI and FGD guides explored participants' understanding, perceived advantages, and concerns regarding HIV self-testing. We asked promoter participants about their willingness to distribute test kits and encourage HIV self-testing uptake and linkage to care or prevention within their respective groups. Each interview lasted approximately one and a half hours. Participants were compensated KSHS 500 (approximately \$3.50 USD) for their time. The de-identified IDI and FGD audio files were transcribed and stored securely in a password-protected electronic folder on password-protected laptops and only qualitative study team members had access.

Data analysis

IDI and FGD audio recordings were translated/transcribed by study team members or an external translation consultant from either Dholuo or Swahili into English. A separate study qualitative team member reviewed the initial translated transcripts to ensure for translation and content accuracy. An extensive coding and analysis process was undertaken by a team of six researchers using both inductive and deductive approaches, following a framework methodology [42]. This involved developing a coding framework by combining deductive methods, drawing codes from theory-informed interview guides, and inductive methods, identifying potential inductive codes from Charmaz's two-stage process involving line by line open coding of initial transcripts followed by development of focused codes [43]. The codebook underwent refinement as needed through additional data review and an inter-coder reliability process among the six coders. The six coders, including a senior Kenyan social scientist, a Kenyan qualitative research coordinator, and four qualitative research scientists based in the United States (U.S.), collaborated after coding approximately two transcripts each to ensure consistent code application. Any discrepancies among the coders were addressed through discussion to reach consensus, periodically refining code definitions (see Table 1 for key themes and sub-themes). Codes were applied using the qualitative

Table 1 Key themes and sub-themes around HIV self-testing

Key theme: HIV self-testing (HIVST)	
Sub-Theme	Description
Benefits of HIVST	Apply this code when participants discuss advantages they foresee with the HIV self-tests
Challenges/ barriers of HIVST	Apply this code when the participant(s) foresee challenges with the HIVST kits and any concerns they have on HIVST kits
Distribution of HIVST kits	Apply this code when the participant(s) mentions what they would feel about giving out HIVST kits
Incidence of using HIVST kits	Apply this code when the participant(s) describes a specific experience they had using an HIVST kit
Information needed	Apply this code when participants talk of information that they need about HIVST kits
Knowledge about HIVST kits	Apply this code when participants talk about what they know about HIVST kits
Feelings about HIVST kits	Apply this code when participants talk about their feelings about HIVST kits
Likelihood of using HIVST kits	Apply this code when the participant or other community members talk about if they would actually use the HIVST kits when given by someone
Other men handling HIVST negative results	Apply this code when the participant talks about what other men would do after their HIVST results showed they were negative
Other men handling HIVST positive results	Apply this code when the participant talks about what other men would do after their HIVST results showed they were positive
Reactions to receiving HIVST kits	Apply this code when the participant talks about how they would react to receiving an HIVST kit result that showed they were negative
Self-handling of HIVST positive results	Apply this code when the participant talks about what they themselves would do after their HIVST results showed they were positive

Table 2 Socio-demographic characteristics of the study participants (N=65)

Characteristics	n (%)
Study Arm	
Control	33 (50.8)
Intervention	32 (49.2)
Age	
< 35	33 (50.8)
≥ 35	32 (49.2)
Education	
Some primary	31 (47.7)
Completed primary	20 (30.8)
Completed secondary or higher	14 (21.5)
Marital status	
Single/widowed/divorced	11 (16.9)
Married	54 (83.1)
Beach community	
Beach 1	18 (27.7)
Beach 2	23 (35.4)
Beach 3	24 (36.9)
Monthly Income	
< 10,000 KSH (~ \$80)	37 (57.8)
10,000–20,000 KSH (~ \$80–\$160)	17 (26.6)
> 20,000 KSH (~ \$160)	10 (15.6)

data management and analysis platform Dedoose [44]. After the initial coding, a team-based framework analysis approach, led by a senior U.S.-based investigator, was employed to collaboratively identify and organize major and minor emergent themes in the data that were salient to the key objectives of the study to understand facilitators and barriers to HIV self-testing usage among social network cluster members, and promoters' willingness

to distribute and promote self-testing among their peers [42].

Ethical approval

The research obtained approval from the Kenya Medical Research Institute-Scientific Ethics Review Unit (KEMRI-SERU; #677) and the University of California, San Francisco - Institutional Review Board (UCSF-IRB; #19-20285). This research fully adhered to the Declaration of Helsinki. Prior to involvement in the study, all participants provided written informed consent.

Results

Among the 65 fishermen in this qualitative sub-study, about half of the men were under 35 years of age. Most men (83%) were married and had either attended some or completed primary school (78%), while the remaining (22%) had completed secondary school. Of the three beaches in Siaya County where this study took place, beach 1 had slightly fewer participants than beaches 2 and 3. When asked about income, nearly two-thirds of men reported earning less than 10,000 KSHS/80 USD per month (Table 2).

In the results below, we describe participants' knowledge of HIV self-testing and their source of information, their experiences with and perceptions of HIV self-testing, including willingness to use HIV self-testing, the perceived benefits of self-testing, and the challenges they anticipate with using HIV self-testing. Lastly, we describe promoters' reported willingness to distribute HIV self-testing kits to those within their close social networks. Although we purposively sampled participants based on age (> 35 and < 35 years), beach community, and study

role (promoter vs. network member), we did not see differences in responses based on these criteria.

Fishermen's knowledge of HIV self-testing

Knowledge of HIV self-testing was close to universal, with nearly all participants saying they had heard about HIV self-testing, with approximately half reporting that they had first learned about HIV self-testing through the Owete study, i.e. shortly before the interview. The Owete study had described HIV self-testing during the informed consent process since it was a key component of the planned intervention and during a separate quantitative survey.

"[I heard about HIV self-testing] from the research team, they were the first ones to introduce us to them [HIV self-testing]." Beach 3; <35 years of age.

Other sources of HIV self-testing information included health facility staff, community health workers, and advertisements.

"When I go to the hospital I'm normally told if you fear testing, I can give you this thing to carry to the house and test yourself." Beach 3; <35 years of age.

Several participants understood that the self-testing process involves swabbing gums for saliva for an immediate result.

"...now there's some gadget which is swabbed on the gums. You swipe it in the gum this way then there is some liquid that you add to it, then you wait for some time, then the results will be out." Beach 3; <35 years of age.

Men were also aware that it can be done anywhere and anytime. Some participants mentioned HIV self-testing availability at health facilities and chemists, but few had actually seen a HIV self-testing kit.

In Kenya, once a person has used an HIV self-testing kit, a formal HIV test at health facility is advised to confirm results. In this sample, only one participant mentioned the need for confirmatory testing at the health facility following testing via HIV self-testing.

HIV self-testing experience, willingness to use, and perceived benefits

While few ($n=7$) participants had used HIV self-testing prior to joining Owete, nearly all recognized the importance of knowing their HIV status, expressed willingness to use HIV self-testing, and had a positive outlook on its utility. Findings revealed that men identified privacy and

convenience as the most pronounced benefit of self-testing compared to facility-based testing.

"It [HIV self-testing] can be used anytime...and you can use them when you are alone." Beach 3; <35 years of age.

Knowing that one can test at home away from others' eyes was viewed as an important feature to prevent stigma, gossip and inadvertent disclosure.

"It [HIV self-testing] is good because nobody gets to know your secret since you use it on your own and you are the one who gets to know your status alone." Beach 2; ≥35 years of age.

The freedom to choose when and where to test was seen as a valuable perk, by making testing easier, more accessible, and not disrupting work schedules by needing to go to a health facility to test.

"If it is something easier for me to use, I would just use it because you find that the hospital is at distance and you are busy at work. So when I have it in that case, I can test at any time. So that I can get to know my status." Beach 1; <35 years of age.

Although few had used HIV self-testing, all seven HIV self-testing users reported ease of use. Interestingly, four of the seven HIV self-testing users had tested in the presence of their partner, illustrating that these particular men felt that testing at home and with their partners present was safe, they trusted their partners, and felt comfortable with HIV status disclosure. Among the overall cohort, the perceived HIV self-testing benefit of privacy and preventing inadvertent disclosure was related to potential risks when testing at a health facility, hence valuing the option to test at home where community members cannot see, overhear, or jump to conclusions about their HIV status.

"Yes, I have even seen and received the test kits and tested myself at home with my wife, we even exchanged the test kits to see each other's result." Beach 2; <35 years of age.

Perceived barriers to HIV self-testing use-

Potential barriers to men's HIV self-testing use included their fear of receiving a sero-positive result and the resulting psychological distress and ability to self-manage a seropositive result without a trained counselor present, stigma if a kit was discovered, and being unsure of how to use and correctly interpret the HIV self-testing kit results. Perceived barriers were similar among men who

had used self-test kits in the past compared to those who had not, with two men stating that fishermen may also be skeptical of self-test kit accuracy. None of those who had self-tested in the past mentioned challenges to its use as a barrier.

"If I for instance test myself when I was not expecting the test to show that I am HIV positive...[I] may have a lot of stress for a number of days." Beach 3; <35 years of age.

Concerns around stigma encompassed worries that giving a HIV self-testing kit to someone or seeing someone with a HIV self-testing kit may lead others to jump to conclusions and believe that the person has HIV.

"...someone may also feel that if you give him this thing [HIV self-testing], it will be like you have judged him [HIV] positive." Beach 1; <35 years of age.

Among men who had never used HIV self-testing kits, there was a concern over the possible inability to correctly use and interpret HIV self-testing kits and that this could be a problem that hinders use. This was not a concern among those who used HIV self-testing kits in the past, ease of use was high among the few previous users.

"It could be because if you do not know how to use it [HIV self-testing], how to start using it, you wouldn't know. Then you take it from there [health facility], instead of using it, you are keeping it." Beach 2; ≥35 years of age.

Men also thought that few of their peers would go for confirmatory testing at clinics after self-testing if their results were negative. Fishermen felt that if men self-tested and were negative, they would feel relieved and would not want to risk the chance of feeling stigmatized by going to the clinic for confirmatory testing. However, men felt that men with seropositive results would go to the hospital to confirm results, after taking time to process the results, and start on ART to "continue their life" if confirmed sero-positive.

HIV self-testing distribution in the community

Owete promoters, highly socially-connected individuals that were identified by peers, were later tasked with HIV self-testing kit distribution in the Owete trial. The baseline interview findings with Owete promoters revealed that nearly all promoters would willingly distribute HIV self-testing kits to help members of their social network know their HIV status. They expressed that these are

individuals they have established relationships with and feel comfortable talking to them.

"...this is a person that I have a lot of discussions with, and I know their thoughts deeply and they also know mine, so it is easier for me to give him this thing [HIV self-testing]..." Beach 3; <35 years of age.

Promoters stressed the importance of approaching HIV self-testing discussions strategically and thoughtfully to first garner trust and engagement through pleasantries and to assess the mood and readiness of their social network members and then to shift to more sensitive health topics.

"You must find a way of creating rapport with him, you make some stories then you inform him about the actual reason why you are visiting him." Beach 3; ≥35 years of age.

They also emphasized the importance of listening to self-testing questions from network members and the need to be trained to respond to such questions.

Discussion

This qualitative study conducted at baseline of an intervention trial found that although few Kenyan fishermen had ever used HIV self-testing, there was generally a high level of awareness of its utility and positive perceptions of HIV self-testing. The potential benefits of HIV self-testing stemmed from the privacy afforded by testing at home, and convenience of HIV self-testing rather than having to travel to a health facility for testing, and the perceived simplicity of the method. These benefits align with those noted in other studies on HIV self-testing in SSA, and underscore that self-testing addresses many of the HIV testing barriers associated with testing at facilities [27, 45–48]. The fear of having privacy compromised, feeling stigmatized, and needing to leave work are concerns with facility testing that can be mitigated with HIVST [6, 27, 34, 48, 49]. This high acceptance and the perceived benefits of HIV self-testing have been confirmed in a systematic review among men in SSA and among other populations [31, 49–52]. HIV self-testing may also facilitate couples' HIV testing since it can be done privately at home. Of the few in this study who had used HIVST, about half had tested with their partner. Another study in Kenya found that couples testing was more likely with HIV self-testing (75.4%) than at the health facility (33.2%) [31]. This overall positive outlook on HIV self-testing utility is promising for testing initiatives.

Men selected to act as "Promoters" of HIV testing and linkage to their known peers widely expressed willingness to distribute HIV self-test kits to other men in their

close social networks. The combination of men in the fishing communities indicating their interest in HIV self-testing and their influential social network-central peers being willing to distribute HIV self-testing to them illustrates the potential of HIV self-testing as a tool to know one's status— and suggests that a peer-based approach in which peers are already known and trusted contacts may be an ideal way to reach high-priority groups of men with HIV testing. In Tanzania, 68% of men were willing to distribute HIV self-test kits to their close friends [53] and in Uganda 82% of peers were willing to distribute to fishermen in their community [54]. Leveraging existing social networks to promote testing has the potential to reverse low HIV testing uptake trends among men [53]. This study also revealed the importance of topic knowledge and communication style when approaching a sensitive and stigmatized condition like HIV with peers. Distribution success among peers requires establishing trust, recognizing the right time to bring up HIV testing, and confidently understanding HIV self-testing utility through training and education.

Men perceived many HIV self-testing advantages, but also voiced concerns about usage. Understanding the HIV self-testing kit procedures, results interpretation, and the absence of counseling if the test reveals HIV seropositive results were important concerns reported by participants. Other studies among priority populations in SSA have noted similar apprehensions [27, 49]. Although pre- and post-test counselling are provided through confirmatory testing at the health facility where it is routine, a gap exists at the time of HIV self-testing. Moreover, as this study and other findings demonstrate, men are reluctant to go to health facilities [4, 8, 14, 27, 55, 56]. Other studies involving HIV self-testing in SSA corroborate the importance of pre- and post-test counseling with HIV self-testing [45, 51]. Testing is the first step in the HIV cascade and it is therefore important to leverage that initial step with innovative and structured approaches to provide immediate HIV counseling with HIV self-testing for mental health, well-being, and for linkage to prevention for those HIV seronegative and treatment for those with HIV seropositive results. Counseling outside of health facilities and over the phone may be options to consider. Education and training on HIV self-testing, as well as confidential peer and clinic support, may also be instrumental in addressing these barriers [45, 49].

Additionally, although broad HIV self-testing awareness was indicated, it was not complemented by knowing where to obtain HIV self-tests in the community. Few participants had ever encountered HIV self-testing kits in health facilities or pharmacies. There is a need to ensure HIV self-testing kits are widely available in health facilities, pharmacies, and markets given the interest in use. A study in Tanzania found HIV self-testing availability

associated with sharp increases in HIV testing [52] while a study in South Africa found that community distribution of HIV self-testing led to significantly higher testing coverage among men [57].

Given the generally low uptake of HIV services and high HIV prevalence among fishermen in western Kenya, it is important to leverage the advantages and overcome the challenges of HIV self-testing. Building on the high acceptability of HIV self-testing, the benefits it affords (privacy, efficiency, and flexibility of when and where to use), the willingness of socially networked individuals to engage their peers and provide them with HIV self-testing information and kits may spark HIV-self testing uptake, if complemented with strategies to address barriers. Working on solutions to ensure for immediate counseling and linkage support for individual using HIV self-test kits, raising awareness and accessibility of HIV self test kits in the community, ensuring they are free or at nominal cost are essential to combat obstacles to use. This combination of factors along with continued evaluation of HIV self-testing use over time has the potential to inform HIV self-testing policies and strategies and improve HIV epidemic prevention and control by increasing testing uptake among those unaware of their status and improve linkage to HIV services.

This study was subject to limitations. Participants in this study were fishermen from communities around Lake Victoria in western Kenya and may not represent the views of other populations. However, given the high HIV incidence and prevalence in this area of Kenya, the viewpoints of these fishermen are critical to understanding how to better engage this high priority population in HIV testing. It is important to highlight that interviews and FGDs were conducted at baseline, prior to study intervention and reflect initial impressions of HIVST acceptability. Follow-up is needed to determine ongoing acceptability of HIVST in this population. It is also possible that the qualitative data may not have captured diverse views from fishermen. We tried to minimize this by sampling widely across ages and from three distinct beach communities. It is possible that some participants may have provided responses to please the interviewer, however our experienced interviewers were not part of the fishing community, were not care providers at clinics where fishermen may seek services, and were trained to establish an open and non-judgmental demeanor and confidentiality of information shared during in interviews and FGDs, to facilitate discussion of sensitive topics. All interviewers were also native speakers of the languages spoken in the setting. Notwithstanding these limitations, study findings offer insights to inform strategies for implementation of HIV self-testing approaches in this high priority population and setting.

Conclusions

While few fishermen had ever used HIV self-test kits, this study found high awareness, positive perceptions, and “promoter” willingness to use and distribute HIV self-test kits to other men. The positive outlook on HIV self-testing and social network dissemination approach among fishermen may address the persistent HIV testing rates among men and high HIV prevalence in the region. The “promoter” model, with known peers engaged in disseminating HIV self-testing information and services, showed promise for engaging men in testing. Follow-up findings are warranted to determine sustained acceptability and HIV self-testing use over time, but this baseline study points to the need to bolster awareness of the benefits of HIV self-testing, minimize stigma and build trust among this high-risk population.

Abbreviations

FGDs	Focus group discussions
HIVST	HIV self-testing
IDIs	Individual in-depth interviews
IRB	Institutional Review Board
KEMRI	Kenya Medical Research Institute, Scientific Ethics Research Unit
KSHS	Kenya Shillings
SERU	Scientific and Ethics Review Unit
SSA	Sub-Saharan Africa
UCSF	University of California San Francisco
UNAIDS	Joint United Nations Programme on HIV/AIDS
USD	US Dollar

Acknowledgements

We would like to thank the fishermen that participated in this study and the Siaya County community for their support. We would like to express our gratitude to Dr. Kawango Agot for her dynamic vision and engagement in this study. May she rest in peace. We would also like to acknowledge and appreciate the study staff for their contributions to the study, specifically Hellen Aoko Awuoch, Alfred Odira, Fredrick Odera, Stella Akoth Onyango, John Odhiambo Oginga, Rachel Adhiambo Ochieng, Bob Seje, Sheillah Akinyi Oloo, David Odhiambo Ang'awa, Irene Atieno Opiyo, Lennah Adhiambo Oluoch, Mourine Atieno Ambitho, Maurine Akoth Odhiambo, Peter Okongo Abade, Winnie Abade, Lucy Atieno Okech, Hezrone Omondi Ochieng, Daniel Otieno Shikuku, Elly Okoth Obongo, Irene Atieno Opiyo and Antony Juma Ochung.

Author contributions

CSC, HT, ZK, and KA conceptualized this study. DA and LO conducted the qualitative interviews. CSC, ZK, and PO developed the qualitative codebook with input from SG, JLK, HN and MT. PO, SG, JLK, HN, and MT conducted qualitative coding and analysis under the guidance of CSC and ZK. JLK, PO, and SG wrote the first draft of the manuscript with input from HN and MT. ZK, KA, EAB, BA, and PO supervised and operationalized the study in the field. All authors participated in review and revisions of manuscript and reviewed and approved the final manuscript.

Data availability

De-identified study data and a data dictionary will be made available in a secure online repository approximately 1 year after completion of the ongoing trial (NCT04772469) following Owete Scientific Committee approval of a concept sheet summarizing the analyses to be done, with a signed data access agreement. Further inquiries can be directed to the Owete Scientific Committee via Carol.Camlin@ucsf.edu.

Declarations

Ethics approval and consent to participate

The study was approved by the institutional review boards at the Kenya Medical Research Institute's Science Ethics Review Unit (KEMRI-SERU, No 677) and the University of California, San Francisco International Review Board (UCSF-IRB, No. 19-20285). This research fully adhered to the Declaration of Helsinki. All participants were 18 years of age and older and provided informed consent prior to study participation.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Author details

¹Department of Obstetrics, Gynecology and Reproductive Sciences, University of California San Francisco, San Francisco, CA, USA

²Impact Research and Development Organization, Kisumu, Kenya

³Department of Community Health Systems, School of Nursing, University of California San Francisco, San Francisco, CA, USA

⁴Department of Medicine, Division of Prevention Sciences, University of California San Francisco, San Francisco, CA, USA

⁵Center for Microbiology Research, Kenya Medical Research Institute, Kisumu, Kenya

⁶Division of Infectious Diseases, University of California Los Angeles, Los Angeles, CA, USA

⁷Perelman School of Medicine, University of Pennsylvania, Pennsylvania, USA

Received: 14 September 2024 / Accepted: 27 February 2025

Published online: 14 March 2025

References

- Giguère K, Eaton JW, Marsh K, Johnson LF, Johnson CC, Ehui E, et al. Trends in knowledge of HIV status and efficiency of HIV testing services in sub-Saharan Africa, 2000–20: a modelling study using survey and HIV testing programme data. *Lancet HIV*. 2021;8(5):e284–93.
- West CA, Chang GC, Bray DWC, Kinchen R, Behel S. Unawareness of HIV infection among men aged 15–59 years in 13 Sub-Saharan African countries: findings from the Population-Based HIV impact assessments, 2015–2019. *J Acquir Immune Defic Syndr*. 2021;87(Suppl 1):S97–106.
- Chamie G, Napierala S, Agot K, Thirumurthy H. HIV testing approaches to reach the first UNAIDS 95% target in sub-Saharan Africa. *Lancet HIV*. 2021;8(4):e225–36.
- UNAIDS. Update - Missing men living with HIV: UNAIDS. 2022 [updated January 24, 2022. Available from: https://www.unaids.org/en/resources/presscentre/featurestories/2022/january/20220124_missing-men-living-with-hiv
- National AIDS, STI Control Programme. Kenya Population-based HIV impact assessment. KENPHIA 2018. Final report 2022. Nairobi, Kenya: NASCOP; 2022.
- Camlin CS, Ssemmondo E, Chamie G, El Ayadi AM, Kwarisiima D, Sang N, et al. Men missing from population-based HIV testing: insights from qualitative research. *AIDS Care*. 2016;28(Suppl 3):67–73.
- Sharma M, Barnabas RV, Celum C. Community-based strategies to strengthen Men's engagement in the HIV care cascade in sub-Saharan Africa. *PLoS Med*. 2017;14(4):e1002262.
- Sileo KM, Wanyenze RK, Kizito W, Reed E, Brodine SK, Chemusto H, et al. Multi-level determinants of clinic attendance and antiretroviral treatment adherence among fishermen living with HIV/AIDS in communities on lake Victoria, Uganda. *AIDS Behav*. 2019;23(2):406–17.
- Seeley JA, Allison EH. HIV/AIDS in fishing communities: challenges to delivering antiretroviral therapy to vulnerable groups. *AIDS Care*. 2005;17(6):688–97.
- Skovdal M, Campbell C, Madanhire C, Mupambireyi Z, Nyamukapa C, Gregson S. Masculinity as a barrier to Men's use of HIV services in Zimbabwe. *Global Health*. 2011;7:13.
- DiCarlo AL, Mantell JE, Remien RH, Zerbe A, Morris D, Pitt B, et al. Men usually say that HIV testing is for women: gender dynamics and perceptions of HIV testing in Lesotho. *Cult Health Sex*. 2014;16(8):867–82.

12. Mooney AC, Gottert A, Khoza N, Rebombo D, Hove J, Suárez AJ, et al. Men's perceptions of treatment as prevention in South Africa: implications for engagement in HIV care and treatment. *AIDS Educ Prev*. 2017;29(3):274–87.
13. Treves-Kagan S, Steward WT, Ntswane L, Haller R, Gilvydis JM, Gulati H, et al. Why increasing availability of ART is not enough: a rapid, community-based study on how HIV-related stigma impacts engagement to care in rural South Africa. *BMC Public Health*. 2016;16:87.
14. UNAIDS. Reaching out to men and boys: Addressing the blind spot in the response to HIV. Geneva: UNAIDS; 2017 [Available from: chrome-extension://efaidnbmnnnibpccjpcglclefindmkaj/https://www.unaids.org/sites/default/files/media_asset/blind_spot_en.pdf]
15. Mindry D, Wanyenze RK, Beyeza-Kashesya J, Woldetsadik MA, Finocchario-Kessler S, Goggin K, et al. Safer conception for couples affected by HIV: structural and cultural considerations in the delivery of safer conception care in Uganda. *AIDS Behav*. 2017;21(8):2488–96.
16. Chikovre J, Gillespie N, McGrath N, Orne-Gliemann J, Zuma T. Men, masculinity, and engagement with treatment as prevention in KwaZulu-Natal, South Africa. *AIDS Care*. 2016;28(Suppl 3):74–82.
17. 2023 UNAIDS. UNAIDS Country Fact Sheet, Geneva. UNAIDS; 2024 [Available from: <https://www.unaids.org/en/regionscountries/countries/kenya>]
18. Banadakoppa Manjappa R, Bhattacharjee P, Shaw SY, Gitonga J, Kioko J, Songok F, et al. A sub-national HIV epidemic appraisal in Kenya: a new approach for identifying priority geographies, populations and programmes for optimizing coverage for HIV prevention. *J Int AIDS Soc*. 2024;27(Suppl 2):e26245.
19. Nanyonjo GAG, Ssetaala A, Nakaweesa T, Wambuzi M, Nanvubya A, Mpendo J, Okech B, Kitandwe PK, Nielsen L, Nalutaaya A. Prevalence and correlates of HIV infection among adolescents and young people living in fishing populations along lake Victoria fishing communities in Uganda. *Pan Afr Med J*. 2020;Nov 2(1).
20. Kapesa ABN, Nyanza EC, Mushi MF, Jahanpour O, Ngallaba SE. Prevalence of HIV infection and uptake of HIV/AIDS services among fisherfolk in landing Islands of lake Victoria, North Western Tanzania. *BMC Health Serv Res*. Dec 2018;18(1):980.
21. Kwena ZA, Bukusi EA, Ng'ayo MO, Buffardi AL, Nguti R, Richardson B, et al. Prevalence and risk factors for sexually transmitted infections in a high-risk occupational group: the case of fishermen along lake Victoria in Kisumu, Kenya. *Int J STD AIDS*. 2010;21(10):708–13.
22. Kwena ZA, Camlin CS, Shisanya CA, Mwanzo I, Bukusi EA. Short-term mobility and the risk of HIV infection among married couples in the fishing communities along lake Victoria, Kenya. *PLoS ONE*. 2013;8(1):e54523.
23. Camlin CS, Kwena ZA, Dworkin SL. Jaboya vs. jakambi: status, negotiation, and HIV risks among female migrants in the sex for fish economy in Nyanza Province, Kenya. *AIDS Educ Prev*. 2013;25(3):216–31.
24. Camlin CS, Kwena ZA, Dworkin SL, Cohen CR, Bukusi EA. She mixes her business: HIV transmission and acquisition risks among female migrants in Western Kenya. *Soc Sci Med*. 2014;102:146–56.
25. Camlin CS, Akullian A, Neillands TB, Getahun M, Eyul P, Maeri I, et al. Population mobility associated with higher risk sexual behaviour in Eastern African communities participating in a universal testing and treatment trial. *J Int AIDS Soc*. 2018;21(Suppl 4):e25115.
26. Fiorella KJ, Camlin CS, Salmen CR, Omondi R, Hickey MD, Omollo DO, et al. Transactional fish-for-Sex relationships amid declining fish access in Kenya. *World Dev*. 2015;74:323–32.
27. 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.
28. Johnson C, Baggaley R, Forsythe S, van Rooyen H, Ford N, Napierala Mavedzenge S, et al. Realizing the potential for HIV self-testing. *AIDS Behav*. 2014;18(Suppl 4):S391–5.
29. Stevens DR, Vrana CJ, Dlin RE, Korte JE. A global review of HIV Self-testing: themes and implications. *AIDS Behav*. 2018;22(2):497–512.
30. Lippman SA, Lane T, Rabede O, Gilmore H, Chen YH, Mlotshwa N, et al. High acceptability and increased HIV-Testing frequency after introduction of HIV Self-Testing and network distribution among South African MSM. *J Acquir Immune Defic Syndr*. 2018;77(3):279–87.
31. Masters SH, Agot K, Obonyo B, Napierala Mavedzenge S, Maman S, Thirumurthy H. Promoting partner testing and couples testing through secondary distribution of HIV Self-Tests: A randomized clinical trial. *PLoS Med*. 2016;13(11):e1002166.
32. Matovu JKB, Bogart LM, Nakabugo J, Kagaayi J, Serwadda D, Wanyenze RK, et al. Feasibility and acceptability of a pilot, peer-led HIV self-testing intervention in a hyperendemic fishing community in rural Uganda. *PLoS ONE*. 2020;15(8):e0236141.
33. Thirumurthy H, Masters SH, Mavedzenge SN, Maman S, Omanga E, Agot K. Promoting male partner HIV testing and safer sexual decision making through secondary distribution of self-tests by HIV-negative female sex workers and women receiving antenatal and post-partum care in Kenya: a cohort study. *Lancet HIV*. 2016;3(6):e266–74.
34. Choko AT, Desmond N, Webb EL, Chavula K, Napierala-Mavedzenge S, Gaydos CA, et al. The uptake and accuracy of oral kits for HIV self-testing in high HIV prevalence setting: a cross-sectional feasibility study in Blantyre, Malawi. *PLoS Med*. 2011;8(10):e1001102.
35. Indravudh PP, Fielding K, Kumwenda MK, Nzawa R, Chilongosi R, Desmond N, et al. Effect of community-led delivery of HIV self-testing on HIV testing and antiretroviral therapy initiation in Malawi: A cluster-randomised trial. *PLoS Med*. 2021;18(5):e1003608.
36. Hatzold K, Gudukeya S, Mutseta MN, Chilongosi R, Nalubamba M, Nkhoma C, et al. HIV self-testing: breaking the barriers to uptake of testing among men and adolescents in sub-Saharan Africa, experiences from STAR demonstration projects in Malawi, Zambia and Zimbabwe. *J Int AIDS Soc*. 2019;22(1):e25244.
37. Hensen B, Schaap AJ, Mulubwa C, Floyd S, Shanaube K, Phiri MM, et al. Who accepts and who uses Community-Based secondary distribution HIV Self-Testing (HIVST) kits?? Findings from the intervention arm of a Cluster-Randomized trial of HIVST distribution nested in four HPTN 071 (PopART) communities in Zambia. *J Acquir Immune Defic Syndr*. 2020;84(4):355–64.
38. Choko AT, MacPherson P, Webb EL, Willey BA, Feasy H, Sambakunsi R, et al. Uptake, accuracy, safety, and linkage into care over two years of promoting annual Self-Testing for HIV in Blantyre, Malawi: A Community-Based prospective study. *PLoS Med*. 2015;12(9):e1001873.
39. Sheira LA, Kwena ZA, Charlebois ED, Agot K, Ayieko B, Gandhi M, et al. Testing a social network approach to promote HIV self-testing and linkage to care among fishermen at lake Victoria: study protocol for the Owete cluster randomized controlled trial. *Trials*. 2022;23(1):463.
40. Okore JO, Camlin CS, Lewis-Kulzer J, Gutin SA, Charlebois E, Ayieko B et al. Training social Network-Central fishermen in Western Kenya to distribute HIV Self-Test kits and health facility referral vouchers. *African Journal of AIDS Research* 2024;In.
41. Siaya County K. City Population; 2023 [Population Statistics Charts, Map and Location]. Available from: https://www.citypopulation.de/en/kenya/admin/nyanza/41_siaya/
42. Gale NK, Heath G, Cameron E, Rashid S, Redwood S. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Med Res Methodol*. 2013;13:117.
43. Charmaz K. *Constructing grounded theory*. Los Angeles, CA: Sage; 2006.
44. Dedoose M, Beach CA, SocioCultural Research Consultants LLC. 2021 [Cloud application for managing, analyzing, and presenting qualitative and mixed method research data]. Available from: www.dedoose.com
45. Conserve DF, Muessig KE, Maboko LL, Shirima S, Kilonzo MN, Maman S, et al. Mate Yako Afya Yako: formative research to develop the Tanzania HIV self-testing education and promotion (Tanzania STEP) project for men. *PLoS ONE*. 2018;13(8):e0202521.
46. Martínez Pérez G, Cox V, Ellman T, Moore A, Patten G, Shroufi A, et al. I know that I do have HIV but nobody saw me': oral HIV Self-Testing in an informal settlement in South Africa. *PLoS ONE*. 2016;11(4):e0152653.
47. Kelvin EA, George G, Mwai E, Nyaga EN, Mantell JE, Romo ML, et al. Offering Self-administered oral HIV testing as a choice to truck drivers in Kenya: predictors of uptake and need for guidance while Self-testing. *AIDS Behav*. 2018;22(2):580–92.
48. Gonzalez LL, PK. Warby Vivian Home HIV Testing Gets the Green Light: Journalism for Public Health; 2016 [Available from: <https://health-e.org.za/2016/02/08/home-hiv-testing-gets-the-green-light/>]
49. Knight L, Makusha T, Lim J, Peck R, Taegtmeier M, van Rooyen H. I think it is right: a qualitative exploration of the acceptability and desired future use of oral swab and finger-prick HIV self-tests by Lay users in KwaZulu-Natal, South Africa. *BMC Res Notes*. 2017;10(1):486.
50. Hamilton A, Thompson N, Choko AT, Hlongwa M, Jolly P, Korte JE, et al. HIV Self-Testing uptake and intervention strategies among men in Sub-Saharan Africa: A systematic review. *Front Public Health*. 2021;9:594298.
51. Hlongwa M, Mashamba-Thompson T, Makhunga S, Muraraneza C, Hlongwana K. Men's perspectives on HIV self-testing in sub-Saharan Africa: a systematic review and meta-synthesis. *BMC Public Health*. 2020;20(1):66.

52. Mkopi A, Korte JE, Lesslie V, diNapoli M, Mutiso F, Mwajubwa S, et al. Acceptability and uptake of oral HIV self-testing among rural community members in Tanzania: a pilot study. *AIDS Care*. 2023;35(9):1338–45.
53. Matovu JKB, Mbita G, Hamilton A, Mhando F, Sims WM, Thompson N, et al. Men's comfort in distributing or receiving HIV self-test kits from close male social network members in Dar Es Salaam, Tanzania: baseline results from the STEP project. *BMC Public Health*. 2021;21(1):1739.
54. Choko AT, Nanfuka M, Birungi J, Taasi G, Kitembo P, Helleringer S. A pilot trial of the peer-based distribution of HIV self-test kits among fishermen in Bulisa, Uganda. *PLoS ONE*. 2018;13(11):e0208191.
55. Cornell M, McIntyre J, Myer L. Men and antiretroviral therapy in Africa: our blind spot. *Trop Med Int Health*. 2011;16(7):828–9.
56. Mills EJ, Beyrer C, Birungi J, Dybul MR. Engaging men in prevention and care for HIV/AIDS in Africa. *PLoS Med*. 2012;9(2):e1001167.
57. Lippman SA, Grignon JS, Ditshwane B, West RL, Gilmore HJ, Mazibuko S, et al. Results of the Sukuma Ndoda (Stand up, Man) HIV Self-Screening and assisted linkage to care project in Johannesburg: A Quasi-Experimental Pre-Post evaluation. *J Acquir Immune Defic Syndr*. 2024;96(4):367–75.

Publisher's note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.