Overcoming Barriers to HIV/STD Partner Services in Kenya and the United States

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Abstract

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Increasing the proportion of people living with HIV and sexually transmitted diseases (STDs) who know their status is critical to curbing the HIV and STD epidemics. Partner services (PS) are a core public health strategy that test and treat or link to care the partners of individuals newly diagnosed with HIV or an STD ("index patients"). Targeting the testing of individuals who may have been exposed to HIV or an STD is an effective way to detect new cases. There is not currently an HIV PS program in Kenya, and it will be important to understand and address the barriers to the uptake of the service before implementation. HIV and STD PS are routinely conducted in the U.S., but meeting sex partners through geosocial networking (GSN) apps is an emerging barrier to traditional partner notification among men who have sex with men (MSM). To define and address barriers to PS in Kenya and the U.S., this dissertation (1) explored index patient and health system barriers to HIV PS in Kenya, (2) determined whether HIV PS effectiveness and safety differ based on a history of intimate partner violence (IPV) in Kenya, (3) explored the attitudes around and (4) measured the acceptability of using GSN apps for HIV/STD partner notification among MSM in the U.S.

In a qualitative study in Kenya, we identified key barriers to and created recommendations for increasing the uptake of HIV PS. Encouraging stronger relationships between index patients and HIV testing counselors may elevate trust and increase PS uptake. A patient's decision to

provide partner information may depend on the type of relationship he or she is in, and alternative methods of disclosure may need to be offered to accommodate different contexts. Spreading awareness about PS in the community may make clients more comfortable with the process of providing partner information.

Using data from a cluster-randomized trial of PS in Kenya, we found that history of IPV did not modify the effectiveness of PS in testing, newly diagnosing, or linking partners to care. In addition, history of IPV did not modify the association between receiving PS and relationship dissolution during the study. Taking into consideration the exclusion of those who experienced IPV in the month prior to enrollment, our results suggest that PS is an effective and safe partner notification strategy for index patients with history of IPV in Kenya. As PS is scaled up in different contexts, these data support including those reporting past IPV and closely monitoring adverse events.

In a mixed-methods study of U.S. MSM, our results suggest that GSN app-based partner notification and sexual health services are acceptable to U.S. MSM. Despite most (70%) wanting to be notified by their partner directly, the majority would still get tested if notified through a health department profile (95%) or anonymous in-app message (85%). While 50% preferred notifying a partner using their own profile, 26% preferred health department assistance, and 24% preferred using an in-app anonymous messaging system. Most participants (82%) were comfortable with apps allowing health department profiles to provide users with health services and information, but they indicated that health departments will need to build trust with the MSM community in the apps to ensure acceptable and effective app-based delivery of partner notification.

Collectively, this dissertation provides recommendations to overcome barriers to HIV/STD PS to curb the HIV epidemic in Kenya and HIV and STD epidemics among MSM in the U.S.

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DEDICATION

To my grandmother, Setsuko Hewey.

CHAPTER 1: Introduction

As the global community works towards ending the HIV and sexually transmitted disease (STD) epidemics, targeted prevention strategies are needed. Partner Services (PS) are a core public health strategy used to prevent the transmission of HIV and other STDs. A critical component of PS is partner notification, in which specially-trained health program staff assist individuals who are newly diagnosed with HIV or an STD ("index patients") in confidentially notifying their sex partners of possible exposure. In addition to partner notification, PS include prevention counseling, HIV/STD testing, and treatment or linkage to care for the partners of index clients.

PS have been found to be an effective method for detecting new cases of HIV, syphilis, gonorrhea, and chlamydia in high-resource settings [1–8]. Studies in sub-Saharan Africa have similarly found PS to be effective in identifying and testing partners of HIV-infected index patients [9–12]. Domestically, the Centers for Disease Control and Prevention (CDC) guidelines strongly recommend that all people newly diagnosed with HIV or early syphilis receive PS with active health department involvement [13]. They specify that all people newly diagnosed with gonorrhea or chlamydia are suitable candidates for PS depending on resource availability. Globally, the World Health Organization (WHO) strongly recommends that voluntary PS be offered to people with HIV [14].

Of the estimated 1.2 million people living with HIV in Kenya, approximately 53% are unaware of their HIV-positive status [15,16]. In Kenya, there is not currently an HIV PS program, and the standard of care is to leave index patients responsible for notifying their partners of HIV exposure on their own. Targeted strategies, such as PS, are needed to increase the proportion of those living with HIV who know their status. Before implementing PS as a national HIV prevention strategy in Kenya, it will be important to understand and address the barriers to uptake of the service. The CDC and WHO guidelines mention the potential for intimate partner violence

(IPV) and negative impacts on relationships as a result of partner notification, but they state that data are limited and additional study is needed [17,18]. Little is known about the impact and safety of PS among those who have experienced IPV. An estimated 41% of ever-married women and 11% of ever-married men aged 15-49 in Kenya have experienced physical or sexual violence from a partner in their lifetimes [19]. Understanding the effectiveness and risk of social harms associated with PS among those who have experienced IPV will help inform decisions about how best to notify partners of HIV exposure in that vulnerable population.

In the U.S., PS have historically been used as an HIV prevention and STD control strategy [20–23]. Health department staff routinely elicit partner contact information from index patients to provide PS. Meeting sexual and romantic partners through geosocial networking (GSN) apps is exceedingly common among men who have sex with men (MSM) and poses a barrier to HIV/STD partner notification [24–26]. GSN apps use global positioning system technology on smartphones to allow users to connect with other users based on their location. MSM may not exchange contact information with sex partners met through GSN apps, limiting partner services staff ability to notify partners of HIV/STD exposure through standard partner notification methods [26]. Most health departments do not currently use GSN apps to trace or notify partners of HIV/STD exposure due to ethical and feasibility considerations. Since GSN app use is widespread among MSM, it is important to understand whether it is acceptable to incorporate apps into partner notification practices.

To define and address barriers to PS in Kenya and the U.S., this dissertation (1) explored index patient and health system barriers to HIV PS in Kenya, (2) determined whether HIV PS effectiveness and safety differ based on a history of IPV in Kenya, (3) explored the attitudes around

and (4) measured the acceptability of using GSN apps for HIV/STD partner notification among MSM in the U.S.

Chapter 2: Understanding Barriers to Scaling Up HIV Assisted Partner Services in Kenya

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Why are index patients declining to enroll in PS?

What are the health system barriers to implementing PS?

What are the attitudes of the community around HIV PS?

There is a dearth of information on the barriers to HIV PS uptake in Kenya. Some qualitative studies in high and low-resource settings have found that common barriers to HIV/STD PS are embarrassment, fear of relationship dissolution, fear of stigma, fear of losing financial support, and fear of violence [27–32]. Additionally, studies have found that lack of trust in health workers and concerns about maintaining confidentiality pose barriers to partner notification [28,32]. Qualitative studies on the barriers to HIV PS uptake in Kenya will be essential for understanding the challenges the program may face as it is rolled out nationally. We conducted a qualitative study to explore client, community, and health system barriers to the implementation of PS in Kenya within a cluster randomized trial.

Chapter 3: HIV Assisted Partner Services Among Those With and Without a History of Intimate Partner Violence in Kenya

I*s PS as effective among index patients with a history of IPV compared to those without?*

Is PS as safe among index patients with a history of IPV compared to those without?

Experiencing IPV has been found to be a risk factor for HIV infection in both low and high-resource settings [33–39]. IPV may limit the victim's ability to negotiate condom use, resulting in lower condom use [40,41]. Perpetrators of IPV may engage in higher levels of HIV risk behavior, such as sexual activity outside of their main relationship [42,43]. Since IPV is a risk factor for HIV infection, it is important to consider how PS works among those with a history of IPV.

It is not known whether having a history of IPV has an impact on the effectiveness or safety of HIV PS. In Kenya, partners of women who reported IPV were less likely to come for HIV testing and counseling than partners of women who did not report IPV [36]. In the U.S., it was found that abusive partners were less likely to seek STD testing or treatment after partner notification [44]. A history of IPV may be associated with experiencing negative consequences (IPV, loss of financial support, loss of place to live, and relationship dissolution) upon disclosure of a positive HIV test result to a partner [45]. Fearing violence from a partner has been reported as a barrier to notifying a partner of HIV/STD exposure, and those with a history of IPV may be more likely to fear violence upon HIV disclosure [46–49].

Understanding the effectiveness and risk of social harms associated with PS among those who have experienced IPV will help inform decisions about how best to notify partners of HIV

exposure in that vulnerable population. Using data from a multicenter cluster-randomized controlled trial of PS in Kenya, we determined whether history of IPV modified the effectiveness and risk of relationship dissolution associated with HIV PS.

Chapter 4: Attitudes Around Using Geosocial Networking Applications for HIV/STD Partner Notification

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How are U.S. MSM using GSN apps, and how do they communicate with potential partners?

What are their thoughts about notifying sex partners about HIV/STD exposure through GSN apps?

What are their thoughts about a health department presence on GSN apps?

Men who have sex with men (MSM) are disproportionately affected by HIV and other STDs in the U.S. [50,51]. Despite representing only 2% of the population, MSM make up 56% of those living with HIV, 70% of all new HIV infections each year, and accounted for 81% of primary and secondary syphilis cases in 2016 [50,51]. In addition, gonorrhea among MSM increased by 151% from 2010 to 2015, and bacterial STD rates have been rising nationwide among MSM for the last couple of decades [51–53]. To curb the HIV and STD epidemics among MSM, targeted prevention strategies, such as PS, are needed.

Historically, partners have been notified by health department staff in person or by phone, although some health departments have adapted over time to include notification through email, instant messaging, social networking sites, and sex-seeking sites [54–60]. GSN apps pose unique partner tracing challenges since users often do not have a stable profile, messages with other users are only stored for a limited time, and users can only see profiles based on location. Most health

departments do not currently use GSN apps to trace or notify partners of HIV/STD exposure due to ethical and feasibility considerations. Little is known about the acceptability of partner notification through GSN apps among MSM.

Since GSN apps have become a common method for meeting sex partners among U.S. MSM, it is important for public health departments to adapt HIV/STD prevention strategies, including PS, to incorporate these apps. We conducted a qualitative study to examine how MSM across the U.S. use GSN apps and their perspectives regarding delivery of HIV/STD partner notification and health services through these apps.

Chapter 5: Acceptability of Using Geosocial Networking Applications for HIV/STD Partner Notification and Sexual Health Services

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Is HIV/STD partner notification using GSN apps acceptable to U.S. MSM?

Is a health department presence on GSN apps acceptable to U.S. MSM?

Are sexual health services on GSN apps acceptable to U.S. MSM?

The results from Chapter 4's qualitative study informed the development of an online survey of U.S. MSM. Our survey assessed the acceptability of conducting HIV/STD partner notification, health department presence, and offering sexual health services on GSN apps. This survey is an important step in understanding MSM comfort and preference around various HIV/STD prevention features on GSN apps.

The work in Chapters 4 and 5 was in partnership with Building Healthy Online Communities, a collaboration of public health leaders and gay dating websites and app owners

working together in HIV/STD prevention. Building Healthy Online Communities held its first meeting in 2014, where gay dating app/website owners, public health officials, and community-based organizations joined forces to develop online HIV/STD prevention strategies [61]. Website and app owners have expressed their commitment to promoting the health of their users, and they are interested in understanding what will be effective in preventing new HIV/STD infections [61]. They have indicated their interest in working with public health departments to pilot and evaluate new prevention strategies. The results of our work will provide recommendations for public health departments to incorporate GSN apps into partner services and GSN apps to incorporate HIV/STD prevention features.

Summary

This dissertation defines and addresses the barriers to HIV/STD partner services in Kenya and the U.S. using both qualitative and quantitative methods. As HIV PS is scaled up in Kenya as a national prevention strategy, Chapter 2 provides recommendations for health workers to overcome barriers to enrolling index patients in PS. Chapter 3 provides needed information about the effectiveness and safety of HIV PS among those with a history of IPV. Chapters 4 and 5 define the barriers to PS among U.S. MSM who meet partners through GSN apps and present the attitudes around and the acceptability of conducting HIV/STD partner notification through these apps. Collectively, this dissertation provides recommendations to overcome barriers to HIV/STD partner services to curb the HIV epidemic in Kenya and HIV and STD epidemics among MSM in the U.S.

CHAPTER 2: Understanding Barriers to Scaling Up HIV Assisted Partner Services in Kenya

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Understanding Barriers to Scaling Up HIV Assisted Partner Services in Kenya

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ABSTRACT

Assisted partner services (APS) are more effective than passive referral in identifying new cases of HIV in many settings. Understanding the barriers to the uptake of APS in sub-Saharan Africa is important before its scale up. In this qualitative study, we explored client, community, and healthcare worker barriers to APS within a cluster randomized trial of APS in Kenya. We conducted 20 in-depth interviews with clients who declined enrollment in the APS study and 9 focus group discussions with health advisors, HIV testing and counseling (HTC) counselors, and the general HTC client population. Two analysts coded the data using an open coding approach and identified major themes and sub-themes. Many participants reported needing more time to process an HIV-positive result before providing partner information. Lack of trust in the HTC counselor led many to fear a breach of confidentiality, which exacerbated the fears of stigma in the community and relationship conflicts. The type of relationship affected the decision to provide partner information, and the lack of understanding of APS at the community level contributed to the discomfort in enrolling in the study. Establishing trust between the client and HTC counselor may increase uptake of APS in Kenya. A client's decision to provide partner information may depend on the type of relationship he or she is in, and alternative methods of disclosure may need to be offered to accommodate different contexts. Spreading awareness about APS in the community may make clients more comfortable providing partner information.

Keywords: HIV; Assisted Partner Services; Africa; Attitude; Qualitative Research

INTRODUCTION

Increasing the proportion of people living with HIV who know their serostatus is critical to curbing the African HIV epidemic. Of the estimated 1.2 million people living with HIV in Kenya, approximately 53% are unaware of their HIV-positive status [15,16]. Assisted partner services (APS) are a public health strategy used to prevent the transmission of HIV through testing and treating the sexual partners of infected index cases. As a form of contact tracing, APS provides assistance to index HIV cases in notifying and testing their partners.

Prior studies in the United States have found APS to be effective in identifying and testing sexual partners of HIV-positive index cases [62]. The Centers for Disease Control and Prevention (CDC) strongly recommend that all people newly diagnosed with HIV receive partner services with active health department involvement [17]. Studies in sub-Saharan Africa have also found active partner notification to be more effective than passive referral in finding and testing partners for HIV [9,12]. Passive referral leaves index cases responsible for notifying their partners of HIV exposure. There is not currently an HIV APS program in Kenya, and their current standard is passive referral. *Assisted Partner Notification Services to Augment HIV Testing, Counseling, Treatment, and Prevention in Kenya* is a multicenter, cluster randomized controlled trial aimed at determining the effectiveness of APS in Kenya [63].

There is a dearth of information on the barriers to HIV APS uptake in Kenya. Some qualitative studies in low-resource settings and in the United States have found that common barriers to HIV/STD partner notification services are embarrassment, fear of relationship dissolution, fear of stigma, fear of losing financial support, and fear of violence [27–32]. Additionally, studies have

found that lack of trust in health care workers and concerns about maintaining confidentiality pose barriers to partner notification [28,32]. This study aimed to qualitatively explore the client, community, and health system barriers to the implementation of APS in Kenya within the cluster randomized trial in Kenya.

METHODS

Study Design

This qualitative study was conducted in 2015 in Nairobi and Kisumu County health facilities that were offering APS through the cluster randomized trial. It consisted of in-depth interviews (IDI) and focus group discussions (FGD). The IDIs explored client barriers to enrollment in APS, and FGDs addressed the knowledge and attitudes about partner notification in the community and the implementation challenges the health system faces.

Subjects

In-Depth Interviews

Subjects who declined enrollment in the APS study were selected purposively using quota selection, stratifying on HIV testing site and gender. The experiences of the participants were postulated to be different in urban and rural settings, and we aimed to get a balanced sample from Nairobi and Kisumu Counties. We also aimed to get a roughly equal distribution of males and females since gender may influence the reasons for declining to participate. To be eligible for the IDIs, the subjects had to be at least 18-years-old and newly diagnosed HIV-positive.

Focus Group Discussions

Our focus groups consisted of 3 categories of stakeholders. One category was the health advisors who are HIV testing and counseling (HTC) counselors trained in partner notification and involved in the APS study. Another was the HTC counselors who were not involved in the APS study but worked as HTC service providers in the study's HIV testing sites. Our final category was walk-in clients accessing HTC services. All health advisors were included in the focus groups. HTC counselors and HTC general clients were sampled purposively using quota sampling by gender and site.

Institutional review boards at Kenyatta National Hospital and the University of Washington approved the study, and all participants provided written informed consent.

Data Collection

The interviews and focus groups were conducted in Kiswahili, Luo, or English by a trained Kenyan researcher experienced in qualitative data collection. The interviews took place at the clinic or the client's home, depending on the client's preference. The researcher used semi-structured guides, and the interviews and focus groups were taped using a digital recorder. The same researcher transcribed IDIs and FGDs in their original languages, translated them into English, and back translated them to verify an accurate translation.

Data Analysis

English transcripts were analyzed by 2 coders: the analyst (MG) and the interviewer (MO). The analyst created a start list of themes that were hypothesized to be influential *a priori* (fear of stigma,

state of mind after test results, confidentiality issues, fear of intimate partner violence, and fear of relationship dissolution) (Figure 2.1). Both coders read through all of the transcripts independently and added additional salient themes to the code list using open coding. The analyst compiled the two code lists to create a master codebook, and the two coders discussed the codebook to come to an agreement about each code. Both coders independently coded the data. The analyst used ATLAS.ti version 7.5.9 (Berlin, Germany), and the interviewer used Microsoft Word and Excel. The analyst compared all coded transcripts, and the analyst and interviewer resolved any conflicts in coding. After coding, the two coders selected quotes that best represented each theme and subtheme. The quotes that were selected by both coders were included as representative.

RESULTS

Participant Characteristics

A total of 20 individuals, 8 in Nairobi County and 12 in Kisumu County, participated in IDIs. They had a median age of 40 (interquartile range [IQR]: 30, 47), 8 (40%) were male, and 11 (55%) had an education level of primary school or less. Demographic characteristics of the IDI participants are presented in Table 2.1. A total of 86 individuals participated in 9 FGDs, consisting of 17 health advisors, 45 HTC counselors, and 24 general HTC clients. The demographic characteristics of the counselor FGD participants are presented in Table 2.2, and those of the general HTC clients are presented in Table 2.3.

Seven major themes were identified in the analyses, and our results are presented below by salient theme.

State of mind after receiving an HIV-positive result

The client's state of mind after receiving an HIV-positive test result affected his or her decision to accept APS in that moment. Sixty percent of clients reported experiencing shock or denial after receiving an HIV-positive result, and some expressed needing more time to process their results before providing partner information. As described by some IDI participants:

> *"When I saw the results I was very shocked and at that time I did not want to talk to anyone. My mind was confused that I didn't know what to do and telling my wife or having someone tell her was not in my mind at that time."* (IDI, Male, Age 30)

> *"I think the main reason [for declining APS] is the one I had mentioned earlier that I had just been found positive and I still had a lot of questions to answer within myself. I was living in denial…"* (IDI, Male, Age 51)

Trust between client and HTC counselor

The relationship between the client and HTC counselor acted as a facilitator or barrier to APS enrollment. When counselors showed empathy to the clients, 25 percent of clients reported that it was easier for them to accept their results:

> *"He counseled me and told me not to be scared because I will not be the first or the last to test positive. I gained courage after the talk and tested positive. I asked if my state was so bad and I was about to die, but he told me that I am not doing bad…that I was still very strong. He told me to start medication and make sure I adhere to the doctor's instructions to the letter. That I will even bury so many people who will be dying from*

other diseases not necessarily HIV, and I felt I was calm and ok with the results. So I am continuing with drugs." (IDI, Female, Age 38)

"For me, I was so nervous when I entered the room and my business was I don't want to be asked questions. I just wanted the test to be done and know the result. But the person [HTC counselor] was not in a hurry to even do the test, so he asked first, 'hey, where do you come from, how many partners do you have?' To some extent, I relaxed. I even started giving some stories. And I saw 'so it is not a big thing to know one's status'…when it came to the test, I was so much relaxed." (FGD 2, Female, Age 27)

Some individuals did not feel comfortable participating in APS due to a lack of trust in the HTC counselor. Without a strong rapport between the HTC counselor and client, 50 percent of clients who declined to participate worried about a breach of confidentiality. As described by a participant:

"I think it [declining APS] is because of trust. I thought that by giving them the names and contacts of my partners they would tell them that I am the one who gave their contacts because I tested HIV-positive." (IDI, Male, Age 30)

A couple of participants expressed that good counseling may help clients to provide partner information:

"I think what should be done is proper counseling to the clients. When I am properly counseled, I will be able to provide the contacts of my partners so that they are notified or I come with him." (IDI, Female, Age 36)

To create a strong rapport and trust between the client and HTC Counselor, more than a third of the health advisors suggested that it is important that the same counselor tests, enrolls, and elicits partners:

> *"The one that I tested myself is easier because…it is a client you have initiated and have created a rapport with. So when introducing the study, you will not have a difficult problem because you have been working with him/her. So it is like walking with the client throughout, you are the same person from testing to study initiation."* (FGD 1, Male, Age 40, Health Advisor)

When clients were referred to counselors, the counselors described having a more difficult experience with APS enrollment:

> *"The one we handled from HTC first and then you proceed with the rest…is easier to manage because already you've gained the rapport so it is just the continuation of what you had started. So it used to go smoothly compared to this person who you have been referred because with this person you have to explain confidentiality to win her. So you have to re-affirm confidentiality several times before this person opens up."* (FGD 007, Female, Age 42, Health Advisor)

Many feared that if confidentiality were broken, they would experience stigma in the community and create conflict in their relationships.

Fear of stigma

The fear of stigma was mentioned in terms of the fear of isolation, fear of losing work, and fear of being the subject of gossip. Thirty percent of IDI participants worried that no one would want to associate with them if other people knew they were HIV-positive. As described by a participant:

> *"If they know, they will start discriminating against me and they will not want to be close to me or even associate with me."* (IDI, Male, Age 39)

A couple of participants feared that the community knowing their status would affect their livelihoods:

> *"In my farming job, there are certain things I sell to people like bananas and vegetables, and being that if the word is out that I am HIV-positive, no one will ever want to buy anything from me."* (IDI, Male, Age 48)

Another common fear among 65% of IDI participants was being the topic of gossip in the community:

> *"Friends like talking about each other and when they hear that I am HIV-positive, they will be happy to discuss that with some of my friends. I will be the topic of discussion"* (IDI, Female, Age 35)

Fear of creating conflict in relationship(s)

The fear of creating conflict in relationships was the most frequent theme expressed by participants as a barrier to APS. Sixty percent of IDI participants feared violence from their partners:

> *"He always has problems with me and this will be a reason for him to accuse me. APS program is good, but what I fear is violence at home as a result of that."* (IDI, Female, Age 46)

Seventy-five percent of IDI participants feared the dissolution of their relationship as a result of their partner knowing their HIV-positive status:

> *"If she knows that I am positive, I will lose her."* (IDI, Male, Age 51)

A couple of female IDI participants feared losing financial support:

> *"I am living with him and he is the one supporting me financially. So if I tell him that he will leave me."* (IDI, Female, Age 35)

Additionally, there was a common fear of being blamed for bringing HIV into the relationship among 65% of IDI participants:

> *"I don't want my husband to know. He will start blaming me for infecting him with HIV. And he will definitely know that I am the one who gave his number and the problem will get back to me. My husband is tough headed."* (IDI, Female, Age 46)

Type of Relationship

The stability of the client's relationship arose as an important factor that affected the client's comfort level in participating in APS. As described by an HTC counselor:

> *"The ones who were very comfortable were those in stable and non-abusive relationships. They were like, 'I am testing HIV-positive today and if it is disclosed to my husband, he will do ABCD'. But the ones in unstable and abusive relationships were not comfortable because of the unknown eventualities."* (FGD 9, Female, Age 39, HTC Counselor)

There were also varying levels of responsibility felt to partners depending on the type of relationship. Thirty percent of IDI participants reported not feeling as much responsibility to their partners if they were not their spouses:

> *"If he was my husband and the father of my children, I would have definitely notified him or even hold his hands and come with him to the hospital. You know this one is different. He is just my lover and I don't know where he comes from."* (IDI, Female, Age 38)

A few did not feel responsibility to partners who were one-time partners:

> *"If it is a one-time partner, to hell with him. He can go and die for all I care. I will not have ways of telling him. But if it is a regular partner, I would tell him."* (FGD 2, Female, Age 27, General HTC Client)

Twenty-five percent of IDI participants also expressed less responsibility to partners from relationships that had been terminated:

> *"My mistress got married and lately when I call her she tells me she is married in Nairobi. I never told her about my HIV status because she is already gone."* (IDI, Male, Age 30)

Additionally, several participants expressed a fear of a breach in confidentiality if they know they are their partner's only partner. As a participant described it:

> *"I know I have only one sexual partner and I am told that your sexual partner is positive, of course I will know it is him. This is why you hear of some scandals where someone has been killed…so it is good to ask more to establish whether this partner has one partner or more before doing the notification." (*FGD 8, Female, Age 44, HTC Counselor)

Alternative Methods of Notification

Just as the level of responsibility and comfort in disclosure may vary based on the type of relationship the client is in, some participants expressed preferring other disclosure methods to APS. About a third of participants preferred to bring their partner in for couples testing and pretend that it was their first time learning their results:

> *"When I test positive, you can just come to my house and pretend that you have never seen me. Don't tell him that I have been to the VCT. Pretend you have never seen me and test us a fresh. So he will see my status and I will also see his."* (FGD 2, Female, Age 30, General HTC Client)

Several participants expressed a desire to disclose before their partner was notified:

> *"Let me be the one to notify him first and when he says no and becomes difficult then I will give you his number to talk to him. He can suspect that I am the one who gave you his contacts. Let me be the one to tell him first before you can come in when he doesn't accept."* (IDI, Female, Age 38)

Community awareness about APS

The theme of lack of understanding of APS at the community level was a barrier to implementation. The lack of awareness may make clients feel less comfortable giving partner information. As described by a participant:

> *"People are still not aware about the program so maybe if proper marketing or advertising can be done then it may be ok because people will know that something like that exists and will not be shocked when they are called or notified."* (IDI, Male, Age 30)

DISCUSSION

While APS was generally well accepted in the Kenya study, this qualitative study identified key barriers to the implementation of APS in Kenya. Many of these barriers are consistent with the findings of qualitative studies in other settings; several new ideas also emerged.

The idea that clients may need more time to digest their test results before being willing to provide partner information was not presented as a major theme in prior studies. This theme may have arisen in our study since some of the IDIs were done with individuals who had declined enrollment in APS months before. They were able to process their results and reflect on why they initially declined. While some clients experience shock and denial, effective counseling may help them to accept their results.

Counselors showing empathy and developing a rapport with clients often facilitated acceptance of results and elicitation of partners. Developing a rapport with clients was reported to be easier when the same counselor tested, enrolled, and elicited partners as opposed to getting the client through a post-test referral. Understanding that partner elicitation could be more difficult if the counselor did not do the testing will have important implications for the scale up of the program. It will be valuable to determine methods of establishing client trust and confidence in the counselor to facilitate APS.

Lack of trust in the HTC counselor prevented some individuals from participating in APS. Mistrust in health workers and concerns about maintaining confidentiality were found to be barriers to partner notification in other settings as well [28,32,64]. If confidentiality is broken, many clients expressed a fear of stigma in the community and creating conflict in relationships. These fears are consistent with those found in other settings [27–32]. When HIV status is disclosed involuntarily, individuals have been found to experience increased perceived stigma from others [65]. To avoid fears of stigma and relationship conflicts, it is important that the client understands and trusts that confidentiality will be maintained.

The type of relationship each client has may influence his or her comfort level in participating in APS, and clients may prefer alternate methods of notifying partners. Partner notification preferences varying based on type of relationship has been found in other settings. Other studies have found that notifying transient partners is often thought to be less important than notifying a regular partner [27,29,32,66]. Additionally, the lack of community awareness about APS may make individuals feel less comfortable naming partners.

This study had a number of important strengths. First, the triangulation of perspectives of declining clients, health workers, and the community allowed for a fuller picture of the barriers to the APS program. Second, this study had IDIs with clients who actually declined APS, as opposed to those who hypothetically declined. Third, the person who completed the interviews, transcription, and translation was also a coder of the data. This assures that the context of the conversations was not lost in the analyses.

This study was not without limitations. While we sampled a roughly equal distribution of gender and study site, we were not able to capture the variation of responses in other demographic characteristics such as age or socioeconomic status. Our small sample size and nonrandom sample limit generalizability, but our results add to the knowledge about barriers to the implementation of APS in sub-Saharan Africa. Additionally, interviewing some of the declining clients months after they declined could make our results susceptible to recall bias.

In the process of implementing the APS program in Kenya, it is important to understand and address the barriers the program may face. Encouraging stronger relationships between the client and HTC counselor may elevate trust and increase the uptake of APS in Kenya. A client's decision to provide partner information may depend on the type of relationship he or she is in, and alternative methods of disclosure may need to be offered to accommodate different contexts. Spreading awareness about APS in the community may make clients more comfortable with the process of providing partner information.

Table 2.1: In-depth interview participant characteristics

	IDI Participants (N=20) n(%) or Median (IQR)
Age	40 (30, 47)
Sex	
Male	8 (40)
Female	12 (60)
Primary school or less education (≤ 8 years)	11 (55)
Marital Status	
Never Married	4 (20)
Widowed	3 (15)
Divorced	2 (10)
Married	11 (55)
Site	
Nairobi	8 (40)
Kisumu	12 (60)
Number sex partners in last 3 years	
0	2 (10)
1	6 (30)
2+	12 (60)
HIV-positive	20 (100)

Table 2.2: Focus group discussion health advisor and HTC counselor characteristics

Focus Group No.	No. of Participants	Title	Site[1]	Age Median (IQR)	Male n (%)	Tertiary Education or higher n (%)	No. months working Median (IQR)
1	9	Health Advisor	KNH[2]	29 (28, 30)	5 (56)	9 (100)	24 (13, 24)
3	13	HTC Counselor	KNH[2]	35 (32, 41)	6 (46)	13 (100)	84 (48, 120)
6	11	HTC Counselor	Kombewa	30 (26, 35)	3 (27)	10 (91)	4 (2, 18)
7	8	Health Advisor	Kisumu	36 (35, 40)	4 (50)	8 (100)	13 (12, 25)
8	8	HTC Counselor	Kiambu	35 (27, 46)	3 (38)	8 (100)	28 (12, 42)
9	13	HTC Counselor	Kisumu	26 (22, 29)	4 (31)	13 (100)	15 (3, 41)

[1] Site locations: KNH and Kisumu are urban; Kombewa and Kiambu are peri-urban,
[2] Kenyatta National Hospital in Nairobi, Kenya

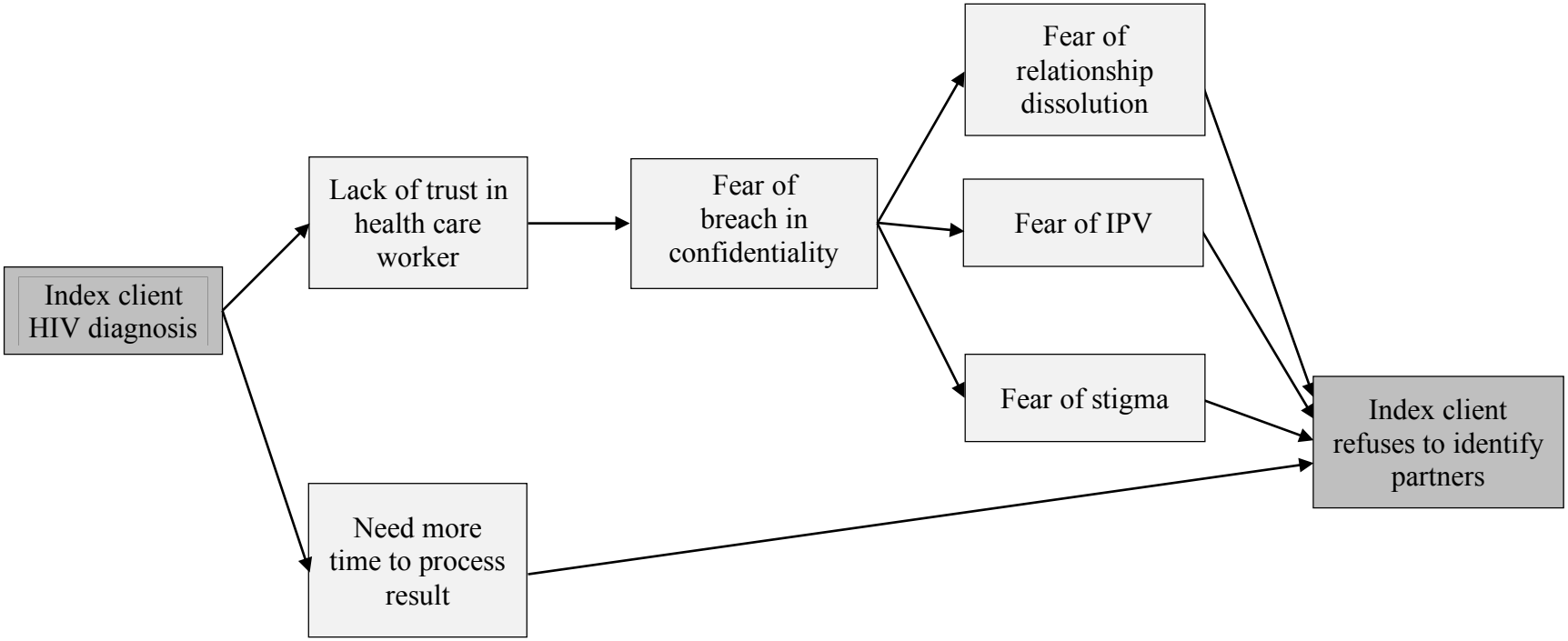
Table 2.3: Focus group discussion general HTC client characteristics

Focus Group No.	No. of Participants	Site[1]	Age Median (IQR)	Male n (%)	Tertiary Education or higher n (%)	Married n (%)	No. sex partners last 3 years Median (IQR)	HIV+ n (%)
2	8	KNH[2]	28 (23, 30)	5 (63)	7 (88)	3 (38)	2 (2, 3)	0 (0)
4	8	Abidha	35 (28, 46)	2 (25)	0 (0)	6 (75)	1 (1, 1)	8 (100)
5	8	Kombewa	24 (18, 25)	2 (25)	1 (13)	2 (25)	1 (1, 2)	5 (63)

[1] Site locations: KNH is urban, Abidha is rural, and Kombewa is peri-urban

[2] Kenyatta National Hospital in Nairobi, Kenya

Figure 2.1: Conceptual framework for index client refusal to participate in APS



CHAPTER 3: HIV Assisted Partner Services Among Those With and Without a History of Intimate Partner Violence in Kenya

HIV assisted partner services among those with and without a history of intimate partner violence in Kenya

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ABSTRACT

Background: HIV Assisted Partner Services (APS) are a notification and testing strategy for sex partners of HIV-infected index patients. This cluster-randomized controlled trial secondary data analysis investigated whether history of intimate partner violence (IPV) modified APS effectiveness and risk of relationship dissolution.

Setting: HIV testing and counseling sites in Kenya.

Methods: Eighteen sites were randomized to provide immediate APS (intervention) or APS delayed for 6 weeks (control). History of IPV was ascertained at study enrollment and defined as reporting ever experiencing physical or sexual partner violence. Those reporting IPV in the month prior to enrollment were excluded. This analysis tested whether history of IPV modified intervention effectiveness and risk of relationship dissolution using population-averaged Poisson and log-binomial generalized estimating equation (GEE) models. An exploratory analysis determined history of IPV correlates using log-binomial GEE models.

Results: The study enrolled 1119 index participants and 1286 partners. Among index participants, 81 (7%) had history of IPV. History of IPV did not modify the effectiveness of APS in testing, newly diagnosing, or linking partners to care. History of IPV did not modify the association between receiving immediate APS and relationship dissolution during the study.

Conclusion: Taking into consideration the exclusion of those who experienced IPV in the month prior to enrollment, our results suggest that APS is an effective and safe partner notification strategy for index patients with history of IPV in Kenya. As APS is scaled up in different contexts, these data support including those reporting past IPV and closely monitoring adverse events.

Keywords: HIV; Assisted Partner Services; Partner Notification; Africa; Intimate Partner Violence

INTRODUCTION

In working towards ending the AIDS epidemic, it is critical to get HIV-infected individuals in care and virally suppressed to improve their own health and prevent the infection of others. Assisted Partner Services (APS) are a public health strategy used to promote the notification and testing of sex partners of persons with newly diagnosed HIV infection ("index patients"), and through that effort ensure that infected partners are treated, and uninfected partners remain HIV-negative. APS involves a health care professional actively helping index patients to notify and provide testing and linkage to care services to partners (also called provider referral); this is in contrast to passive referral, which leaves index patients responsible for notifying their partners on their own. APS has been found to be more effective than passive referral in identifying and testing partners of HIV-infected index patients in high-resource settings [1–4]. Studies in sub-Saharan Africa have similarly found APS to be more effective than passive referral in identifying and testing partners of HIV-infected patients [9–11].

Of the estimated 1.2 million people living with HIV in Kenya, approximately 53% are unaware of their HIV-positive status [15,16]. In Kenya, there is currently no national HIV APS program, and passive referral is the standard of care. Before implementing APS as a national HIV prevention strategy in Kenya, it will be important to understand and address the barriers to uptake of the service. The Centers for Disease Control and Prevention (CDC) and World Health Organization (WHO) guidelines mention the potential for intimate partner violence (IPV) and negative impacts on relationships as a result of partner notification, but they state that data are limited and additional study is needed [17,18]. In the United States, HIV partner notification has not been found to increase the risk of social harms in observational studies [67–69]. In sub-Saharan Africa, HIV

partner services studies have reported very few incidences of social harms occurring throughout the course of research [9,11,70].

It is not known whether having a history of IPV has an impact on the effectiveness or safety of APS. In Kenya, partners of women who reported IPV were less likely to come for HIV testing and counseling than partners of women who did not report IPV [36]. In the United States, it was found that abusive partners were less likely to seek sexually transmitted infection (STI) testing or treatment after partner notification [44]. A history of IPV may be associated with experiencing negative consequences (IPV, loss of financial support, loss of place to live, and relationship dissolution) upon disclosure of a positive HIV test result to a partner [45]. Fearing violence from a partner has been reported as a barrier to notifying a partner of exposure to HIV/STIs, and those with a history of IPV may be more likely to fear violence upon HIV disclosure [46–49].

Little is known about the impact and safety of APS among those who have experienced IPV. An estimated 41% of ever-married women and 11% of ever-married men aged 15-49 in Kenya have experienced physical or sexual violence from a partner in their lifetimes [19]. Understanding the effectiveness and risk of social harms associated with APS among those who have experienced IPV will help inform decisions about how best to notify partners of HIV exposure in that vulnerable population. Using data from a multicenter cluster-randomized controlled trial of APS in Kenya, this study determined whether history of IPV modified the effectiveness and risk of relationship dissolution associated with HIV APS.

METHODS

Analyses were performed using data from a multicenter cluster-randomized controlled trial of APS in Kenya that enrolled HIV-positive index participants from August 2013 to 2015. Detailed protocol and methods have been published [10,71]. Briefly, 18 HIV testing and counseling (HTC) sites were selected for the study, and a restricted randomization process was used to allocate sites (1:1) into immediate APS (intervention) and delayed APS (control) arms. The arms were balanced on site characteristics such as county and proximity to a city. To be eligible for the study, index participants had to be at least 18 years old, be able to give informed consent, test HIV-positive at one of the study sites, not be enrolled in HIV care, and be willing to provide information on at least one sex partner from the preceding 3 years. Index participants were excluded if they were pregnant or had experienced IPV in the month before study screening. Sex partners of index participants were eligible for the study if they were at least 18 years old and able to provide informed consent.

At enrollment, 6-week, and 3-month follow-up visits, index participants completed a standardized face-to-face interview to provide data including demographic characteristics, sexual behavior, HIV testing history, economic factors, and social harms. Interviews were conducted by HTC counselors trained in partner services ("health advisors"). At enrollment, index participants were additionally interviewed about their sexual history with each partner in the prior 3 years.

Sex partners of index participants were traced immediately in the intervention arm and after a 6-week delay in the control arm. The 6-week delay provided the index participants with the opportunity to notify their partners of HIV exposure on their own. At enrollment, health advisors

completed a standardized face-to-face interview with partners to collect data including demographic characteristics, sexual behavior, HIV testing history, and social harms. The partners in the intervention arm were followed up after 6 weeks and data was collected on HIV history, treatment, and social harms through the same standardized interview process. The partners in the delayed arm completed the same 6-week follow-up interview on the same day as their enrollment.

History of IPV was assessed during the screening prior to enrollment. Index participants were asked whether they had experienced physical, emotional, or sexual violence from a partner in the past month or ever. Physical IPV includes being physically hurt by a partner. Emotional IPV includes being threatened, frightened, insulted, or treated badly by a partner. Sexual IPV includes being forced by a partner to participate in sexual activities. If index participants experienced any type of IPV (physical, emotional, or sexual) in the month before screening or feared any type of IPV as a result of study participation, they were categorized as being at high risk for IPV and were excluded from the study. If they had ever experienced any type of IPV, but not in the past month, they were categorized as being at moderate risk for IPV and were included in the study but monitored at 10, 20, and 30 days after enrollment for IPV events. If they experienced any IPV events during the study, they were referred for IPV counseling and services. Any potentially study-related IPV was reported to the study's safety committee. In this analysis, the subgroup of participants with a history of IPV includes only those who have experienced physical or sexual violence to remain consistent with the way IPV is customarily defined [33].

The primary outcomes were the rates of partners tested, newly diagnosed, and linked to care per index participant. In the intervention arm, partners were considered to have been tested during the

study if they tested at their enrollment or reported testing in the 6 weeks before their follow-up visit. In the delayed arm, partners were considered to have been tested during the study if they reported testing in the 2 months prior to their enrollment. Partners were considered newly diagnosed if they were not known to be HIV-positive before the study and tested positive during the study period. Partners were considered linked to care if they reported being enrolled in care at their follow-up visit. The secondary outcome was relationship dissolution, and it was assessed during the standardized interview at the 6-week follow-up visit.

Notification information, such as index participants notifying their partner(s) on their own and sharing their HIV status with anyone other than their partner(s), was assessed at the 6-week follow-up visit. At the 6-week follow-up visit, index participants were asked if they had experienced physical, emotional, or sexual IPV in the last month or ever.

Population-averaged Poisson models with exchangeable correlation structure were used to evaluate the associations between receiving immediate APS and rates of partner testing, new HIV diagnosis, and linkage to care per index participant. This type of model was chosen to account for the correlation within each HTC site. Incidence rate ratios were calculated for each outcome, stratified by history of IPV, and tests for interaction between APS arm and history of IPV used a 5% alpha level.

Log-binomial generalized estimating equation (GEE) models, with exchangeable correlation structure and robust standard errors, were used to evaluate the association between receiving immediate APS and relationship dissolution. Estimates are presented as relative risks (RRs) and

95% confidence intervals (CIs) stratified by history of IPV, and a test for interaction between the APS arm and history of IPV used a 5% alpha level.

In an exploratory analysis, the correlates of history of IPV were assessed through bivariable log-binomial GEE models, with exchangeable correlation structure and robust standard errors, to examine the association between each covariate and history of IPV. Separate models were created for correlates of baseline characteristics and correlates of events that occurred during the study, stratified by gender. All associations are reported as RRs with 95% CIs. In addition, the association between receiving immediate APS and reporting physical or sexual IPV at the 6-week follow-up visit was assessed using a log-binomial GEE model with exchangeable correlation structure and robust standard errors. All analyses were conducted using Stata 13.0 (StataCorp, College Station, TX).

Institutional review boards at Kenyatta National Hospital and the University of Washington approved the study, and all participants provided written informed consent. This trial is registered with ClinicalTrials.gov under number NCT01616420.

RESULTS

Of the 1760 index participants approached by the study staff, 1183 were assessed for eligibility, and 1119 were enrolled into the study. Among those assessed for eligibility, 30 (3%) had experienced physical, sexual, or emotional IPV within the month before screening and were excluded from the study. There were 550 participants receiving services from HTC clinics randomized to provide immediate APS and 569 receiving services from HTC clinics randomized

to provide APS after a 6-week delay. Of the 1119 enrolled index participants, 963 (86%) returned for the 6-week follow-up visit, and 953 (85%) returned for the 3-month follow-up visit. The study enrolled 1286 of the sex partners of the enrolled index participants (621 in the Immediate APS study arm and 665 in the Delayed APS study arm).

The 1119 enrolled index participants had a median age of 30 (interquartile range [IQR]: 25, 38), 38% were male, 61% were married, and 22% used a condom during their last time having sex (Table 3.1). The 1286 enrolled sex partners had a median age of 31 (IQR: 26, 38), 56% were male, 66% were married, and 40% used a condom during their last time having sex (Table 3.2). Of the 1119 enrolled index participants, 81 (7%) had ever experienced physical or sexual IPV at baseline. Of those with a history of IPV, 69 (85%) were female and 12 (15%) were male.

There was no significant interaction between receiving immediate APS and history of IPV on the rates of partners tested (interaction p=0.775), partners newly diagnosed (interaction p=0.870), or partners newly linked to care (interaction p=0.927) (Table 3.3). Additionally, there was no significant interaction between receiving immediate APS and history of IPV on relationship dissolution by the 6-week follow-up visit (interaction p=0.791).

Among female index participants, history of IPV was associated with younger age (p=0.028) and being single (p=0.060), and there were no significant differences in sexual behavior or economic characteristics between those with and without history of IPV. Among male index participants, history of IPV was associated with using a condom at last sex (p=0.023), and there were no significant differences in demographic, other sexual behavior, or economic characteristics between

those with and without history of IPV. During the study, index participants with a history of IPV were less likely among females and more likely among males to notify their partners of HIV exposure on their own compared to those without a history of IPV, but this was not statistically significant (female RR 0.76, 95%CI 0.55, 1.05; male RR 1.26, 95%CI 0.99, 1.61) (Tables 3.4 and 3.5). Female index participants with a history of IPV were nearly 3 times as likely as those without a history of IPV to experience relationship dissolution during the study (RR 2.67, 95%CI 1.45, 4.90). Male index participants with a history of IPV were 4 times as likely as those without a history of IPV to experience relationship dissolution during the study (RR 4.18, 95%CI 1.52, 11.48). Among both female and male index participants, there were no significant associations between having a history of IPV and clinical outcomes, such as linking to care or taking antiretroviral therapy.

Receiving APS was not associated with reporting physical or sexual IPV at the 6-week follow-up visit (5% in immediate arm vs. 3% in delayed arm; p=0.381). Of the reports of IPV during the study, the study staff determined that 2 events (1 in the Immediate APS study arm and 1 in the Delayed APS study arm) could possibly be related to study participation. Neither of these index participants had received APS before experiencing the IPV during the study, but they may have notified their partners on their own as a result of study participation.

DISCUSSION

In this cluster-randomized controlled trial of APS in Kenya that excluded those who experienced IPV in the month prior to enrollment, APS was effective in testing, newly diagnosing, and newly linking to care the sex partners of index participants with and without a history of IPV. APS was

not associated with relationship dissolution during the study among those with or without a history of IPV. Unrelated to receiving APS, female and male index participants with a history of IPV had higher rates of relationship dissolution during the study when compared to those without a history of IPV. Taken together, receiving APS did not increase risk of relationship dissolution, but those with a history of IPV may be at higher risk of relationship dissolution in general.

To our knowledge, no other studies have looked at whether a history of IPV modifies the effectiveness or risk of relationship dissolution associated with APS. In contrast to the United States and Kenyan studies that found abusive partners to be less likely to cooperate in HIV/STI testing and treatment, our study results suggest that partners of those with a history of IPV are no more or less likely than those without a history of IPV to get tested and linked to care after being notified of HIV exposure [36,44].

Our finding of an association between history of IPV and relationship dissolution is consistent with the results of another study that found that a history of IPV was associated with negative consequences upon HIV disclosure, such as relationship dissolution [45]. While those with a history of IPV may be at an increased risk of relationship dissolution as a result of HIV status disclosure, our study found that this risk was similar for those who received and did not receive immediate APS. This finding was also consistent with the results of other studies that did not find an increased risk of social harms as a result of partner notification [67–70]. The counseling that the notified partner received from the health advisor may have contributed to APS not exacerbating the risk of relationship dissolution among those with a history of IPV. In addition, the index participant's identity was kept confidential and those with a history of IPV were monitored for

IPV events at 10, 20, and 30 days after enrollment, which may have helped to avoid negative consequences of disclosure.

While receiving APS was not associated with reporting physical or sexual violence at the 6-week follow-up visit, there were limitations in our measurement of IPV at follow-up. At the 6-week follow-up visit, only 1 index participant (Delayed APS study arm) reported experiencing physical or sexual IPV in the past month, and 37 index participants (23 in the Immediate APS study arm and 14 in the Delayed APS study arm) reported ever experiencing physical or sexual violence. Of those 37 reporting ever experiencing physical or sexual IPV at the 6-week follow-up visit, 10 (27%) did not report having a history of IPV at baseline. Participants may have failed to disclose a history of IPV at baseline and reported their history at follow-up instead, and it is not clear if those who reported ever experiencing IPV at follow-up were reporting IPV that occurred during or before the study. The inability to determine the timing of some of the reported IPV prevented this analysis from investigating incident IPV as a social harm outcome in the main analyses. Study participants often underreport IPV due to normalizing their IPV experiences, trouble recalling events after experiencing trauma, or fear of repercussions from their perpetrator [72]. This study asked about IPV broadly, and respondents may be more likely to disclose IPV if asked about specific experiences while provided with multiple opportunities to disclose history of IPV [73]. Another limitation was that index patients who experienced IPV within a month of enrollment were excluded from the study, which may not make our results generalizable to those at highest risk for IPV. In addition, this study did not collect data on the length of IPV or whether the perpetrator of IPV was a current or past partner, which limits the characterization of the history of

IPV. Taking these limitations into consideration, the small number of IPV events that were possibly study related indicates that APS was safe among study-eligible participants.

Taking into account the exclusion of those who experienced IPV in the month prior to enrollment and the challenges in measuring IPV, our results suggest that APS is an effective and safe partner notification strategy for index patients with a history of IPV in Kenya. As APS is scaled up in different contexts, these data support including those reporting past IPV and closely monitoring adverse events and positive outcomes.

Table 3.1: Index baseline characteristics by randomization arm

	Immediate N=550 n (%) or Median (IQR)	**Delayed N=569** n (%) or Median (IQR)
Demographic factors		
Age	30 (25, 37)	31 (26, 38)
Gender: Male	228 (41.5)	201 (35.3)
Marital Status		
Single	104 (18.9)	100 (17.5)
Currently Married	336 (61.1)	351 (61.7)
Divorced/Widowed	89 (16.2)	104 (18.3)
Live-In Partner	21 (3.8)	14 (2.5)
Has electricity	311 (56.6)	334 (58.7)
Has running water	225 (40.9)	231 (40.6)
Sexual Behavior		
New sex partners in last 3 months		
0	386 (70.2)	439 (77.2)
1+	164 (29.8)	130 (22.8)
Lifetime sex partners[1]		
<5	317 (58.0)	294 (51.8)
5+	230 (42.0)	274 (48.2)
Used condom at last sex[2]	137 (24.9)	111 (19.5)
Ever given money for sex	102 (18.6)	87 (15.3)
Ever received money for sex	94 (17.1)	122 (21.4)
Economic factors		
Way to support self	381 (69.3)	433 (76.1)
Stable place to live	496 (90.2)	503 (88.4)
Have children	455 (82.7)	482 (84.7)

[1]Analyzed only among 547 immediate arm and 568 delayed arm index participants.
[2]Analyzed only among 550 immediate arm and 568 delayed arm index participants.
IQR, interquartile range

Table 3.2: Partner baseline characteristics by randomization arm

	Immediate N=621 n (%) or Median (IQR)	**Delayed N=665** n (%) or Median (IQR)
Demographic factors		
Age	30 (26, 37)	32 (28, 38)
Gender: Male	315 (50.7)	411 (61.8)
Marital Status		
Single	135 (21.7)	141 (21.2)
Currently Married	401 (64.6)	445 (66.9)
Divorced/Widowed	58 (9.3)	62 (9.3)
Live-In Partner	27 (4.4)	17 (2.6)
Has electricity	320 (51.5)	427 (64.2)
Has running water	227 (36.6)	273 (41.1)
Sexual Behavior		
New sex partners in last 3 months		
0	400 (64.4)	465 (69.9)
1+	221 (35.6)	200 (30.1)
Lifetime sex partners[1]		
<5	330 (53.2)	305 (45.9)
5+	290 (46.8)	360 (54.1)
Used condom at last sex[1]	241 (38.9)	273 (41.1)
Ever given money for sex	156 (25.1)	188 (28.3)
Ever received money for sex	140 (22.5)	87 (13.1)

[1]Analyzed only among 620 immediate arm and 665 delayed arm partners.
IQR, interquartile range

Table 3.3: Association between receiving immediate APS and various outcomes, by history of IPV status

Outcomes	History of IPV RR (95% CI)	No History of IPV RR (95% CI)	Interaction p value[1]
Partner testing	4.49 (1.89, 10.65)	5.12 (4.01, 6.53)	0.775
Partner new diagnosis	7.48 (0.96, 58.41)	8.93 (5.22, 15.28)	0.870
Partner new linkage to care	5.23 (0.64, 42.54)	4.74 (3.01, 7.47)	0.927
Relationship dissolution	1.35 (0.53, 3.44)	1.52 (0.95, 2.45)	0.791

[1]Interaction between receiving immediate APS and having a history of IPV on the various outcomes.

APS, assisted partner services; IPV, intimate partner violence; RR, relative risk

Table 3.4: Associations between having a history of IPV and notification, relationship, and clinical outcomes among female index participants

Outcomes	History of IPV #/total	(%)	No History of IPV #/total	(%)	RR (95% CI)	p value
Notification Information (by 6-week follow-up)						
Notified partner(s) on own	21/59	(35.6)	276/538	(51.3)	0.76 (0.55, 1.05)	0.100
HIV status shared with anyone (excluding partners)	27/59	(45.8)	203/538	(37.7)	1.28 (0.96, 1.73)	0.094
Relationship Outcomes (by 6-week follow-up)						
Relationship dissolution	12/59	(20.3)	37/538	(6.9)	2.67 (1.45, 4.90)	0.002
Clinical Outcomes (by enrollment or follow-up visits)						
Linked to Care	60/69	(87.0)	541/621	(87.1)	1.00 (0.89, 1.12)	0.991
On ART	33/69	(47.8)	283/621	(45.6)	1.08 (0.84, 1.38)	0.550

IPV, intimate partner violence; RR, relative risk; ART, antiretroviral therapy

Table 3.5: Associations between having a history of IPV and notification, relationship, and clinical outcomes among male index participants

Outcomes	History of IPV #/total	(%)	No History of IPV #/total	(%)	RR (95% CI)	p value
Notification Information (by 6-week follow-up)						
Notified partner(s) on own	8/9	(88.9)	254/357	(71.2)	1.26 (0.99, 1.61)	0.062
HIV status shared with anyone (excluding partners)	4/9	(44.4)	117/357	(32.8)	1.42 (0.64, 3.15)	0.388
Relationship Outcomes (by 6-week follow-up)						
Relationship dissolution	2/9	(22.2)	19/357	(5.3)	4.18 (1.52, 11.48)	0.006
Clinical Outcomes (by enrollment or follow-up visits)						
Linked to Care	9/12	(75.0)	367/417	(88.0)	0.85 (0.61, 1.20)	0.356
On ART	8/12	(66.7)	219/417	(52.5)	1.27 (0.89, 1.80)	0.192

IPV, intimate partner violence; RR, relative risk; ART, antiretroviral therapy

CHAPTER 4: Attitudes Around Using Geosocial Networking Applications for HIV/STD Partner Notification: A Qualitative Study

Attitudes Around Using Geosocial Networking Applications for HIV/STD Partner Notification: A Qualitative Study

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ABSTRACT

Meeting sex partners through geosocial networking (GSN) apps is exceedingly common among men who have sex with men (MSM). MSM may not exchange contact information with partners met through GSN apps, limiting patients' and health departments' ability to notify partners of HIV/STD exposure through standard notification methods. We explored the perspectives of U.S. MSM regarding delivery of partner notification features through GSN apps, using online focus groups (4 groups; N=28). Most participants were comfortable with HIV/STD partner notification delivered via GSN apps, either by partner services staff using a health department profile or by an anonymous messaging system in the app. However, they indicated that health departments will need to build trust with the MSM community in the apps to ensure acceptable and effective app-based delivery of partner notification.

Keywords: Geosocial networking applications; MSM; Partner Notification; HIV; STDs

INTRODUCTION

Men who have sex with men (MSM) are disproportionately affected by HIV and other sexually transmitted diseases (STDs) in the U.S. [50,51]. Despite representing only 2% of the population, MSM make up 56% of those living with HIV, 70% of all new HIV infections each year, and accounted for 81% of primary and secondary syphilis cases in 2016 [50,51]. In addition, gonorrhea among MSM increased by 151% from 2010 to 2015, and bacterial STD rates have been rising nationwide among MSM for the last couple of decades [51–53]. To curb the HIV and STD epidemics among MSM, targeted prevention strategies are needed. Partner services (PS) are a core public health strategy used to prevent the transmission of HIV and other STDs. A critical component of PS is partner notification, in which specially-trained health program staff assist individuals newly diagnosed with HIV or an STD ("index patients") in confidentially notifying their sex partners of possible exposure. PS have been found to be an effective method for detecting new cases of HIV, syphilis, gonorrhea, and chlamydia in the U.S. [1,2,5–8,62].

Meeting sexual and romantic partners through geosocial networking (GSN) apps is exceedingly common among MSM and poses a barrier to HIV/STD partner notification [24–26]. GSN apps use global positioning system technology on smartphones to allow users to connect with other users based on their location. MSM may not exchange contact information with sex partners met through GSN apps, limiting partner services staff ability to notify partners of HIV/STD exposure through standard partner notification methods [26]. Historically, partners have been notified in person or by phone, although some health departments have adapted over time to include notification through email, instant messaging, social networking sites, and sex-seeking sites [54–60]. GSN apps pose unique partner tracing challenges since users often do not have a stable

profile, messages with other users are only stored for a limited time, and users can only see profiles based on location. Most health departments do not currently use GSN apps to trace or notify partners of HIV/STD exposure due to ethical and feasibility considerations. On dating/hookup websites, health departments and website users have been supportive of health-department initiated HIV/STD partner notification through the sites, but only a minority of website owners reported being willing to implement the intervention [74]. Little is known about the acceptability of partner notification through GSN apps among MSM.

Since GSN apps have become a common method for meeting sex partners among U.S. MSM, it is important for public health departments to adapt HIV/STD prevention strategies, including partner services, to incorporate these apps. This qualitative study examined how MSM across the U.S. use GSN apps and their perspectives regarding delivery of HIV/STD partner notification and health services through these apps.

METHODS

Study Design

This qualitative study was conducted in February and March 2017 among MSM living in the U.S. who use GSN apps to meet sex partners. We conducted 4 online focus group discussions (FGDs) to explore how MSM meet and communicate with sex partners through GSN apps, attitudes towards PS, and perspectives regarding different strategies for HIV/STD partner notification and health services through the apps. Each focus group consisted of 6-8 participants.

Study Participants

We recruited participants through banner advertisements on Facebook and Instagram. Advertisements were targeted based on any self-reported demographic information related to online profiles. Interested potential participants clicked on the advertisement and completed an eligibility screener. Eligibility criteria included: age 18 years or older, U.S. residence, meeting a male sex partner through a GSN app in the last 12 months, and willing to provide informed consent.

Study staff purposively selected racially/ethnically and geographically diverse respondents for invitation to participate in the online FGDs. FGDs were stratified based on age (<35, ≥35) and history of diagnosis with HIV, syphilis, gonorrhea, or chlamydia (ever versus never) into four groups: (1) aged <35 with a history of HIV/STD, (2) aged ≥35 with a history of HIV/STD, (3) aged <35 with no history of HIV/STD, and (4) aged ≥35 with no history of HIV/STD. The cut-point of age 35 was chosen to approximate a meaningful generational difference in exposure to mobile phone and texting technology. We hypothesized that this difference might influence attitudes and behaviors surrounding the use of such technology in general and its use to notify partners or access health-related services in particular. We anticipated that those with a history of HIV/STD may have different perspectives on partner notification than those who have never had to notify partners of exposure to HIV/STDs. In addition, we wanted to reduce the possibility of stigmatization within the FGDs as participants discussed real experiences with partner notification and to ensure our ability to distinguish between hypothetical versus real experiences. Participants received a $60 Amazon gift certificate for their time. The institutional review board at the University of Washington approved the study, and all participants provided informed consent.

Data Collection

Three facilitators conducted the online FGDs (MG, RF, and DK) using the group chat function on Zoom Meeting [75], using established online FGD methods [76–79]. Participants created aliases to protect their identities from other focus group members and used computers, smartphones, or tablets during the discussion. The facilitators led the text-based discussion using a semi-structured discussion guide. Each FGD lasted 90 minutes and included the following topics: (1) how MSM use GSN apps, including to meet potential partners, (2) how MSM communicate with potential partners in the apps, (3) their thoughts about notifying sex partners about an HIV/STD diagnosis, (4) their thoughts about strategies for notifying partners of potential exposure to HIV/STD through the apps, and (5) their thoughts about a health department presence on the apps.

When asking about partner notification strategies using apps, the facilitators asked participants to share their attitudes around hypothetically having to notify a partner and be notified by a partner about exposure to HIV/STD through the following three methods:

Method 1: Partner services staff offers to notify index patient's partners using a health department profile on the app while keeping the index patient's identity anonymous.

Method 2: Partner services staff offers to coach the index patient in how to tell sex partners about the exposure through the index patient's own app profile.

Method 3: The app has a feature that allows the index patient to anonymously send a message in the app to notify any user about possible HIV/STD exposure.

Participants expressed how notifying and being notified would feel to them through the various partner notification methods. Written transcripts of the conversations were saved from the online FGDs.

Data Analysis

Upon review of transcripts, facilitators determined no new emergent themes arising after the fourth FGD. We then matched excerpts to each topic area of inquiry using Dedoose version 7.0.23 [80]. Two facilitators independently produced a summary sentence of responses to each question. Inter-rater reliability was high (92%), and a third coder facilitated discussion among coders to reconcile differences in interpretation. Representative quotes were selected by facilitators, and spelling and punctuation errors were corrected for the quotes displayed in the results section.

RESULTS

Participant characteristics

Twenty-eight men participated in 4 online FGDs. Participants had a median age of 31 (interquartile range: 21, 50), 39% were non-Hispanic white, 46% lived in the U.S. South, and 50% had ever been diagnosed with HIV, syphilis, gonorrhea, or chlamydia (Table 4.1). During the online FGDs, 57% used a computer, 29% used a smartphone, and 14% used a tablet. Grindr was the most common GSN app used by participants, and Tinder was predominantly used by younger participants. There were no substantial differences in participant responses based on age or history of HIV/STD diagnosis.

Communication through GSN Apps

Participants described careful screening of potential partners met through apps. Before meeting in person, most described chatting in the app and exchanging photos. Younger men described verifying that the other user was real through Snapchat or Instagram. Once they decide to meet in person, phone numbers are sometimes exchanged:

[Question: How do you decide whether to share contact information with people on apps?] *"Multiple face pictures first, then Snapchat, then if they're real they can get my number."* (Age 19, HIV/STD History)

Most do not give out their last names, addresses, or personal details even if the conversation is going well. In response to what information participants do not give out:

"Personal info, some people get real nosy. Never my last name and sometimes an alias name." (Age 45, HIV/STD History)

"I won't tell someone where I live, work, or hangout. Ultimately most personal identifiers are on a need to know unless I feel there is potential there." (Age 24, No HIV/STD History)

Many men mention blocking partners on an app after a hookup:

"Very difficult to find guys again after you hook up on Grindr. I'm guilty of blocking guys after I hook up so I don't have to talk to or see them again." (Age 20, No HIV/STD History)

"They [partners] usually pop up, but I like blocking them right away to avoid that awkwardness." (Age 19, HIV/STD History)

In general, participants reported that partners are easy to find again on the apps unless the partner blocks them, deletes his profile, or changes his username. Most said that 'favoriting' partners' app profiles or saving chats with them facilitates finding them again. In some apps, users have unique usernames that are searchable, but this feature varies by app. Some participants mentioned that app users are typically in the same location, which makes them easy to find again. Although, one participant expressed difficulty in finding a former partner:

"I actually had to find the guy that passed it to me. Since using the app was impossible to find him, I spent hours with friends being detective on the internet! I had his address, picture, and first name. But I hit a dead end of sorts. It just so happened that my sister lived

> *in the same city as him (as I was visiting her at the time) and she had mutual friends with him on Facebook."* (Age 23, HIV/STD History)

General Attitudes towards Partner Notification

Overwhelmingly, participants expressed a responsibility to tell partners about exposure to HIV or another STD themselves, regardless of the type of STD or type of relationship they had with the partner.

> *"I believe you need to tell your partner immediately whether you've been dating a month, a week, or like 10 years."* (Age 29, HIV/STD History)

Most men said they would tell a partner themselves, and some thought it would be cowardly to use partner services staff from the health department to notify a partner. Exceptions to this included concerns for safety or stigma. When asked about having health department staff notify a partner about exposure through standard methods (phone or in person), one participant responded:

> *"That feels spineless. If I did this to someone, I need to be the one to tell them."* (Age 21, No HIV/STD History)

However, another participant expressed a different point of view:

> *"I disagree about the spineless part. If a person was closeted or needed some level of anonymity, I respect that he would go to a health professional at all."* (Age 18, No HIV/STD History)

Although most men wanted a partner to notify them about the exposure directly, nearly all men ultimately wanted to know about the exposure, regardless of who notifies them. Most participants preferred to be notified through a phone call or a text message from partners they do not know well and in person from partners they do know well, but the overall sentiment was that they wanted

to know regardless of how they were told. In the words of one participant, *"I'll take honesty in any form"* (Age 52, No HIV/STD History).

Men reported mixed feelings about being notified about the exposure by the health department. Some thought it could feel cold and impersonal and did not like that they would not find out who exposed them; others liked the potential to ask health-related questions and be connected to resources.

> *"I have had that happen [been notified by partner services staff from the health department], and while it was somewhat impersonal, it was helpful and informative."* (Age 50, HIV/STD History)
>
> *"I feel more comfortable with the health care providers, because they have the resources to help me, whereas with the partner telling me, I would have to seek out those resources."* (Age 18, No HIV/STD History)

One participant from a small, conservative town expressed concern about compromising privacy if notified by the health department: *"I wouldn't want to hear from the health department here. Everyone knows everyone. This is small town Tennessee. I quit seeing a doctor because they said I had an STD. I got slut shamed"* (Age 62, HIV/STD History).

Partner Notification through Partner Services Staff in GSN Apps

When presented with hypothetically notifying a partner using Method 1, where partner services staff offer to notify participants' partners using a health department profile in the app, most participants said they would decline the offer and notify their partners themselves. For some

participants, using this method of notification would depend on how close they were with the partner.

> *"Would thank them [partner services staff] for their service but I would decline and do it [notify] myself."* (Age 23, HIV/STD History)
>
> *"I think I would almost prefer that over in person for the strangers who I've hooked up with, but if I had been seeing a few people consistently, I think I would say it face to face to them."* (Age 18, No HIV/STD History)

Participants were then asked how they would feel about Method 2 of having a partner services staff member from their local health department coach them in what to say when sending a notification message on their own through the app. Men had mixed feelings about the coaching offer:

> *"I wouldn't want coaching. That makes it cold and impersonal. I would thank them [partner services staff] and decline. I prefer to do things my way so I know my point gets across."* (Age 23, HIV/STD History)
>
> *"If I had a personal 'STD coach' so to speak to guide me throughout the entire process of telling people and coping with it, I think that'd be a health care revolution in terms of personal care."* (Age 18, No HIV/STD History)

Participants were also asked how they would feel about receiving a notification message through a health department profile on the app. While there were some participants who liked the idea of health department notification in an app, others felt that they would question the authenticity of the health department profile and worry about the confidentiality of the messages. Some men expressed concerns over malicious intent: "*it could be a fake profile out trying to scare people"* (Age 23, HIV/STD History). A few men disliked the idea of the government knowing what apps

they are on: "[I] worry about the Big Brother aspect but appreciate the notification" (Age 46, HIV/STD History).

Despite some skepticism about the authenticity of a message from a health department profile, the consensus was that participants would get tested if they received a message in the app about being exposed to HIV or another STD:

> *"It [getting tested] is the most logical thing to do. If you have an entity telling you that you may have been exposed to something, are you willing to take the risk that it is false?"* (Age 23, HIV/STD History)
>
> *"I will get in touch immediately for peace of mind."* (Age 29, HIV/STD History)

Partner Notification Using an Anonymous Messaging System in GSN Apps

Overall, participants were amenable to receiving an anonymous notification message through the app (Method 3), and some expressed that they would feel grateful for the message. One participant expressed that *"being anonymous might encourage the guy [partner] to reveal it"* (Age 62, HIV/STD History). Some liked that this was a way to notify without involving a health professional:

> *"That [anonymous] message was good and keeps a health care provider out."* (Age 20, No HIV/STD History)

However, others would prefer that a health professional was involved:

> *"A health department has some credibility rather than an anonymous person who may or may not be real."* (Age 19, HIV/STD History)

Next, participants were asked if they would use an anonymous messaging feature in the app to tell sex partners that they may have been exposed to HIV or another STD. While many participants would want to notify partners more directly, some mentioned that they would use the anonymous messaging feature in an app. Participants liked the ease of notifying with this method and would find it useful if they do not have contact information for the partner or if they had a large number of partners from the app:

> *"I'd use a feature that allowed me to anonymously tell any of my sex partners with app profiles about the exposure. It's common courtesy, and they have a right to know."* (Age 53, No HIV/STD History)
>
> *"I would use it if I didn't have the information of the person [sex partner]."* (Age 20, No HIV/STD History)
>
> *"If I had a high number of potential contacts on the app then perhaps."* (Age 24, No HIV/STD History)

Some participants wanted to be able to customize the anonymous message that was sent to their partners, but another participant pointed out that this could enable app users to send messages for malicious purposes: *"someone would have to be able to look it over as well. Like you wouldn't want someone to send hate mail like that"* (Age 24, No HIV/STD History).

No participants thought that having a feature in the app that helps users tell other users about HIV/STD exposure would deter them from using the app. Some felt that having that feature would show that the app cared about the health of the community, while others said that it would be nice but would not change whether they used the app. Many would think better of the app for having this feature, and this did not change the way most men would feel about the app's other users.

> *"It [an app partner notification feature] is not really that important to me. It would be nice, but it wouldn't necessarily be a draw."* (Age 29, HIV/STD History)
>
> *"It [an app partner notification feature] tells me that the app is serious and cares about the health of the community they are serving."* (Age 18, No HIV/STD History)
>
> *"I'd feel safer using the app. At least I know that it cares about its users. There are many other apps that don't have that option [an app partner notification feature] so I think I'd prefer the ones that do."* (Age 19, HIV/STD History)

Health Department Profiles on GSN Apps

Most participants were enthusiastic about the idea of accessing health-related information and services from health department profiles on the apps: *"I think it's a good idea. They could also answer questions that people have in general rather than just delivering bad news"* (Age 19, HIV/STD History). Men would expect health department representatives on the apps to be knowledgeable about sexual health. They would appreciate information on HIV/STD testing, referrals to health care providers, and referrals for HIV/STD counseling.

However, some participants from rural communities or geographic areas politically hostile to the LGBTQ community mentioned that having health departments on an app could make them uncomfortable:

> *"When the town is socially conservative and homophobic, there is a great chance in the health department that the workers would be uncompassionate and biased."* (Age 36, HIV/STD History)

> *"As long as they were looking out for the gays and not out to get us."* (Age 18, No HIV/STD History)

Some men felt it was important that the health department staff have a pro-LGBTQ presence on the apps to build trust among the users:

> *"I would feel safer and more taken care of if the person [health department staff] was knowledgeable of the issues and history and complexity of the gays. Someone who has worked with the gay community on health issues."* (Age 18, HIV/STD History)

Many participants raised concerns about verifying the authenticity of a health department profile on the app. To make a health department profile look authentic, participants suggested using the health department logo as the profile picture and including contact information for the health department staff who manage the profile, such as a phone number, address, and website. Several participants suggested having the app verify that the health department profile was real by making that profile look different from other profiles:

> *"It has to be very clearly identified as the health department, maybe even if there was a way to engage the app companies to personalize or augment those profiles so that they looked different enough to be distinguished from all other profiles."* (Age 24, No HIV/STD History)

One participant suggested having a health department section built into the app instead of a profile, and a few others suggested that health departments have verified Twitter accounts to link the profile to:

> *"Unless they had some sort of validation through the app, like a verified Twitter account, I would not like it."* (Age 18, No HIV/STD History)

HIV/STD Health Services Offered Through GSN Apps

Most men would like app features that would enable them to receive HIV/STD testing reminders and alerts about STD outbreaks in the area.

> *"I think that would be a good thing to keep in mind. If there were an outbreak and I got a message, it would remind me to check with potential partners."* (Age 19, HIV/STD History)
>
> *"STD testing calendar updates and check ins would be a major plus."* (Age 24, No HIV/STD History)

DISCUSSION

Participants were generally comfortable with HIV/STD partner notification occurring within these apps, either by partner services staff using a health department profile or by a hypothetical anonymous messaging system in the app. In addition to partner notification, many men were enthusiastic about the idea of accessing health information and services, such as HIV/STD testing reminders and notification of local disease outbreaks through the apps. While most participants were amenable to a health department presence on GSN apps, a positive and pro-LGBTQ presence on the apps and in the community at large was felt to be essential to gain the trust of MSM who use these apps.

While a New York health department reported that partner services staff may not have contact information to trace partners that MSM diagnosed with STDs met through GSN apps [26], our study's participants expressed that partners are generally easy to find again on the apps unless the

partner blocks them, deletes his profile, or changes his username. Participants reported that blocking other users is common. Similarly, a study of MSM in Australia found that men often blocked a partner and/or deleted contact information for him soon after sexual contact [81]. Developing app-based methods for partner notification has the potential to overcome these barriers to tracing partners using standard methods such as phone calls and field visits.

Overwhelmingly, participants expressed a responsibility to tell a partner about HIV/STD exposure themselves, regardless of the type of relationship they had with the partner. Some participants liked the idea of being able to notify casual partners met via the apps using an anonymous in-app messaging system or having partner services staff notify these partners using a health department profile. Similarly, Australian MSM reported a stronger sense of moral responsibility to notify regular partners in person and preferred notification methods that ensured anonymity for casual partners, most of which were met online or through apps [81]. They preferred to notify casual partners anonymously out of fear of negative repercussions from those they do not know well. Other studies of MSM have found that they are more willing to notify a main partner than a casual one and may be more likely to notify partners with whom they anticipate future sexual contact [82,83]. Partner notification options through GSN apps may provide MSM who would not otherwise notify casual partners with a way to do so anonymously.

Although most men preferred to be told directly about a potential HIV/STD exposure by their partners, they unanimously expressed that they wanted to know about the exposure, regardless of who told them and how they were told, so that they could seek testing and treatment. Similar to the hypothetical in-app anonymous messaging system, inSPOT is a partner notification website

that allows individuals to send anonymous electronic partner notification email cards. In a study of the acceptability of inSPOT, 77% of MSM reported that they would seek testing if notified of STD exposure by an anonymous email card compared to 95% if notified by a signed email from the partner [84]. While men may prefer to be notified directly by their sex partners, the majority would still test for HIV/STD if notified through an anonymous message.

Many participants were interested in accessing health-related information from their local health departments through GSN apps, consistent with another study of MSM in North Carolina that found that GSN apps were an acceptable source of sexual health information [85]. That study tested the feasibility of a health department profile on GSN apps to answer HIV/STD-related questions. Over the course of 6 months, the health department staff member answered GSN app user questions about HIV transmission, local HIV/STD testing locations, and HIV testing availability. Our study found that some men from geographic areas politically hostile to gay men were wary of the presence of a local health department on GSN apps. If health departments are on apps, it will be essential that they provide accurate health information and are supportive of the LGBTQ community to gain the trust of app users. It will be important for app users to be able to verify that health department profiles are real and for confidentiality parameters to be clear.

This study had a number of important strengths. First, conducting the FGDs online allowed for the inclusion of a diverse sample of MSM from across the U.S. Second, the online medium allowed for greater anonymity for participants and the opportunity to type responses without interruption from other participants, which may have allowed for longer and more honest responses [77]. Third, the data were analyzed by the same researchers who conducted the

interviews, which assured that the context of the conversations was not lost in the analyses. However, this study was not without limitations. First, participants were asked what they thought about app-based partner notification methods hypothetically, which may not reflect whether they would use them in reality. Second, people who were interested in and had the time to participate in a 90-minute online FGD may be different from those who did not with respect to their views on partner notification.

While MSM may prefer to notify regular sex partners about HIV/STD exposure on their own, anonymous partner notification methods through GSN apps may provide a more comfortable and desirable way to notify casual or harder-to-reach partners. GSN app companies and public health departments should work together to create strategies for incorporating GSN apps into partner services and will need to engage with MSM communities to ensure their successful implementation. Future research should assess the generalizability of these results in the U.S. and determine the uptake and effectiveness of app-based partner notification strategies.

Table 4.1: Characteristics of Focus Group Participants

Characteristic	Participants N=28 n(%) or Median (IQR)
Age	31 (21, 50)
Race/Ethnicity	
Non-Hispanic White	11 (39)
Non-Hispanic Black	5 (18)
Hispanic	8 (29)
Other	4 (14)
U.S. Census Region	
West	5 (18)
Midwest	7 (25)
South	13 (46)
Northeast	3 (11)
Ever diagnosed with HIV or bacterial STD[1]	14 (50)

IQR, interquartile range; STD, sexually transmitted disease
[1]STDs include chlamydia, gonorrhea, and syphilis

CHAPTER 5: Acceptability of Using Geosocial Networking Applications for HIV/STD Partner Notification and Sexual Health Services

Acceptability of Using Geosocial Networking Applications for HIV/STD Partner Notification and Sexual Health Services

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ABSTRACT

This cross-sectional study of U.S. men who have sex with men (MSM) investigated the acceptability of conducting HIV/STD partner notification and offering sexual health services using geosocial networking (GSN) apps. Participants completed an online survey describing hypothetical scenarios with app-based partner notification methods: sending notification messages through the participant's/partner's app profile, a health department app profile, or an in-app anonymous messaging system. Despite most (70%) wanting to be notified by their partner directly, the majority would still get tested if notified through a health department profile (95%) or anonymous in-app message (85%). While 50% preferred notifying a partner using their own profile, 26% preferred health department assistance, and 24% preferred using an in-app anonymous messaging system. Most participants (82%) were comfortable with health departments having app profiles to provide users with health services and information. Our results suggest that GSN app-based partner notification and sexual health services are acceptable to U.S. MSM.

INTRODUCTION

Men who have sex with men (MSM) bear the heaviest burden of HIV and other sexually transmitted diseases (STDs) in the U.S. [50,51]. Targeted prevention strategies are needed to control the HIV and STD epidemics among MSM. Partner services (PS) are a core public health strategy used to prevent the transmission of HIV and other STDs. A critical component of PS is partner notification, in which specially-trained health program staff assist individuals newly diagnosed with HIV or an STD ("index patients") in confidentially notifying their sex partners of possible exposure. PS have been found to be an effective method for detecting new cases of HIV, syphilis, gonorrhea, and chlamydia in the U.S. [1,2,5–8,62].

Using geosocial networking (GSN) apps to meet sexual and romantic partners has become a norm among MSM and can hinder HIV/STD partner notification [24–26]. GSN apps allow users to connect with other users based on their location using global positioning system technology, potentially without exchanging other contact information. Users on GSN apps often do not have stable profiles, and messages with other users are only stored for a limited time. Health department staff struggle to trace partners met through GSN apps through traditional partner notification methods in the absence of other contact information [26]. While the standard has been for partners to be notified in person or by phone, health departments have adapted partner services delivery over time to include notification through email, instant messaging, social networking sites, and dating/sex-seeking sites [54–60]. GSN apps are not currently used by most health departments to trace or notify partners of exposure to HIV and other STDs. Several U.S. health departments have begun conducting partner notification via GSN apps, but health departments and app companies

need to know that app-based partner notification strategies are acceptable to app users before full-scale implementation.

HIV/STD prevention strategies are being adapted to incorporate apps, but GSN app companies and public health programs need guidance on the most acceptable HIV/STD prevention features for app users. Building Healthy Online Communities is a collaboration of public health leaders and gay dating/sex-seeking website and app owners working together in HIV/STD prevention. Through this collaboration, website and app owners have expressed their commitment to promoting the health of their users and their interest in understanding effective strategies for preventing new HIV/STD infections through their sites/apps [86]. While several app-based HIV/STD prevention features have been studied, a more comprehensive look at the sexual health services that would be desired and used among U.S. MSM is needed. Studies have found that offering sexual health education and counseling services through health educator profiles on apps is acceptable to MSM in North Carolina and Northern California [85,87]. GSN apps have been used as a venue for linking MSM to HIV self-tests, providing sexual health information, and increasing syphilis testing during an outbreak [88–90]. In addition, many GSN apps offer users the option to disclose HIV status, last HIV test date, and sexual health safety practices (condoms, PrEP, and treatment as prevention) on their user profiles. While health services on GSN apps may be acceptable to certain groups of MSM, information is needed on the types of services desired and comfort level with a health department presence on GSN apps among U.S. MSM to incorporate relevant and acceptable HIV/STD prevention features.

This cross-sectional online survey of U.S. MSM investigated the acceptability of and preferences related to conducting HIV/STD partner notification, health department presence, and offering sexual health services on GSN apps.

METHODS

Study Design and Subjects

This online survey of U.S. MSM who use GSN apps to meet partners was conducted from August to October 2017. Study participants were recruited through banner advertisements on Facebook, Instagram, and Snapchat. We oversampled MSM of color to be able to investigate whether acceptability differed by race/ethnicity. Potential participants clicked on the advertisement and were brought to a brief eligibility screening survey in SurveyGizmo. Eligibility criteria included: age 18 years or older, U.S. residence, meeting a male sex partner through a GSN app in the last 12 months, and willing to provide informed consent. Eligible participants completed the online survey and were given the option to enter into a raffle to win a $100 Amazon gift certificate.

The institutional review board at the University of Washington approved the study, and all participants provided informed consent.

Measures

Online survey development was informed by 4 online focus groups that our research team conducted to examine how U.S. MSM use GSN apps and their perspectives regarding HIV/STD partner notification in general and via apps. Novel survey questions were revised through online cognitive interviews with 13 U.S. MSM to improve question clarity. Cognitive interviews were

conducted through audio conference in Zoom Meeting [75], and a screen with the survey questions was shared with the participant during the interview.

The survey included six sections: demographic information, HIV/STD testing, use of GSN apps, partner notification on GSN apps, health services on GSN apps, and substance use and sexual behavior. Our demographic, HIV/STD testing, and substance use and sexual behavior questions were based on the American Men's Internet Survey, an annual web-based behavioral survey of U.S. MSM [91].

Acceptability of and Preferences Regarding GSN App-Based Partner Notification

The acceptability of HIV/STD partner notification using GSN apps was assessed through respondents' rating and ranking of various partner notification methods in two hypothetical scenarios (Table 5.1). The scenarios and methods were validated through cognitive interviews. The partner notification methods using GSN apps included: sending notification messages through the participant's/partner's app profile, a health department app profile, or a hypothetical anonymous messaging system built into the app. Participants were asked to rate their comfort level (very comfortable, somewhat comfortable, somewhat uncomfortable, and very uncomfortable) with each partner notification method and to rank them in order of preference from the one they would "most like to use" to "least like to use". Measuring comfort alone would not indicate which method was preferable, and ranking alone would not indicate whether any of the methods were acceptable. Measuring both comfort and ranking enables us to understand which strategy to put resources into. In addition to the scenarios, respondents were asked if they would like to have the apps provide them with an example partner notification message to help them

determine wording in a notification message to a partner. To address concerns that anonymous notification strategies may not lead to testing, participants were asked about the likelihood that they would get tested for syphilis if notified by a health department profile and if notified by an anonymous message through a GSN app.

Ability to Re-contact Partners Met on GSN Apps

To assess the extent that meeting partners via GSN apps limits the ability of MSM or health departments to conduct partner notification, the survey included questions about what contact information participants exchange with partners met on apps, how many of these partners they think they would "likely be able to contact again if they tried today" and how many they blocked on the app, whether/how they keep track of partners they meet on the apps, and whether/why they have deleted an app profile in the last year. We evaluated exchange of contact information with partners met via apps by asking participants how often they give or receive various pieces of contact information and using this information to determine how contactable the participant or their partners would be outside of the apps. Being "always contactable" was defined as the participant or their partner(s) always having at least one of the following pieces of information: first and last name, phone number, email address, home address, work address, or social media profile name. "Sometimes contactable" was defined as sometimes having at least one of these pieces of information, and "never contactable" was defined as never having any of these pieces of contact information.

Health Services on GSN Apps

To address the acceptability of health department presence on the apps, participants were asked to rate their comfort with health department profiles on the apps for the purposes of providing information and services, what features of a department profile would make them more likely to believe that it was real, and how having health department profiles on an app would affect their likelihood of using the app. In addition, respondents were asked what health services they would use if offered on the apps.

Statistical Analyses

We used respondent IP addresses to identify multiple submissions from the same participant, guided by methods from Grey et. al [92]. Duplicates were identified based on full IP addresses, and only the first completed submission was retained in the dataset. Participants who completed the survey in less than half of the median completion time were flagged as suspicious, and all responses of flagged participants were evaluated manually for questionable and implausible responses.

We conducted descriptive analyses of comfort and preference with the partner notification methods from the hypothetical scenarios. A mean rank score for each method was calculated. McNemar's test for paired data was used to test the difference in intention to test for syphilis after being notified by a health department profile compared to an in-app anonymous messaging system.

We investigated whether comfort with each partner notification method was associated with participant characteristics determined *a priori*. The characteristics investigated were age (<35 vs

35+), race/ethnicity, U.S. census region of residence, and history of HIV or bacterial STD. We used bivariable log-binomial Generalized Linear Models (GLM) to examine each association, and all associations are reported as relative risks (RRs) and 95% confidence intervals (CIs). The cut-point of age 35 was chosen to approximate a meaningful generational difference in exposure to mobile phone and texting technology that could influence comfort with the use of technology to notify partners. We hypothesized that those with a history of HIV/STD may have different perspectives on partner notification than those who have never had to notify partners of exposure to HIV/STDs. Analyses were conducted using Stata 13.0 (StataCorp, College Station, TX).

RESULTS

Of the 6,945 individuals who started the screening questionnaire, 1,410 (20%) were eligible for the study. Among those who were eligible, 791 (56%) completed the survey. Respondents with completed surveys had a median age of 28 (interquartile range [IQR]: 21, 45), 53% were non-Hispanic White, 15% reported being HIV-positive, and 27% had ever been diagnosed with a bacterial STD (Table 5.2). Among those who were eligible, non-Hispanic white men were more likely to complete the survey than men in other racial/ethnic groups ($p<0.001$); survey completion was not associated with age ($p=0.89$) or U.S. region ($p=0.42$).

Acceptability of and Preferences Regarding GSN App-Based Partner Notification

When asked about hypothetically being notified of syphilis exposure, 77% of participants reported that they would be very or somewhat comfortable being notified directly by a partner using his own app profile, 57% by a health specialist using a department profile, and 41% by an anonymous message in the app (Table 5.3). While most (70%) ranked being notified directly by their partner

in the app as the notification method they would most like their partner to use, 20% preferred being notified by a health department profile, and 10% preferred being notified by an anonymous message. Compared to those under age 35, those age 35 and older were more likely to be comfortable with the idea of being notified by a health department profile (65% vs. 52%; RR=1.26, 95%CI 1.12-1.42) and being notified by an anonymous notification message in the app (54% vs. 33%; RR=1.66, 95%CI 1.41-1.96). Compared to those living in the U.S. South, those living in the Midwest and the Northeast were less likely to be comfortable with being notified by a health department profile (Midwest RR=0.81, 95%CI 0.67-0.98; Northeast RR=0.80, 95%CI 0.65-0.98) and being notified by an anonymous notification message in the app (Midwest RR=0.73, 95%CI 0.56-0.95; Northeast RR=0.74, 95%CI 0.55-0.98). Men who reported an HIV/STD history were more likely to be comfortable with the idea of being notified by a health department profile (70% vs. 50%; RR=1.40, 95%CI 1.24-1.57) and being notified by an anonymous notification message in the app (55% vs. 34%; RR=1.60, 95%CI 1.36-1.88) than those who did not. Race/ethnicity was not associated with participants' level of comfort with either method. Participants would be more likely to test for syphilis in response to a notification message from a health department profile than an anonymous notification message in the app (95% vs. 85%, respectively; McNemar's $p<0.001$).

When hypothetically notifying a partner of syphilis exposure, 65% reported that they would be very or somewhat comfortable notifying a partner on their own using their own profile, 71% using a health department profile, and 74% using an in-app anonymous messaging feature that provided a list of partners. While 50% most preferred to notify a partner using their own profile, 26% preferred health department assistance, and 24% preferred using an in-app anonymous messaging

system. Compared to those under age 35, those age 35 and older were more likely to be comfortable notifying a partner through an anonymous notification message in the app using a provided list (79% vs. 71%; RR=1.10, 95%CI 1.02-1.20). Compared to those without a history of HIV or bacterial STD, those with a history were more likely to be comfortable notifying a partner using a health department profile (76% vs. 69%; RR=1.10, 95%CI 1.01-1.21) and notifying through an anonymous notification message in the app using a provided list (79% vs. 72%; RR=1.08, 95%CI 1.00-1.18). Race/ethnicity and U.S. census region were not associated with participants' level of comfort with either method. In addition, 79% of participants reported that they would like apps to provide users with an example partner notification message to help with wording if they were notifying using their own profile. If apps provided users with a way to notify partners of HIV/STD exposure, 63% would use the system, and 46% and 47% would be more or as likely to use the app, respectively.

In real experiences with HIV/STD partner notification, 11% of participants had ever received a partner notification message in an app, and 11% had ever sent a partner notification message to a partner in an app. Among those who had received a partner notification message in an app, 80% received a message from a sex partner and 20% received a message from the health department.

Ability to Re-contact Partners Met on GSN Apps

On average, participants met 79% of their male sex partners in the last year on GSN apps (Table 5.4). Among sex partners met on GSN apps, participants reported having sex more than once with 49% of them, being able to contact 68% of them again, and blocking 15% of them on average. Based on how often respondents reported providing specific contact information to partners they

met on the apps, 51% of participants would always, 48% would sometimes, and 1% would never be contactable by these partners. Based on how often respondents reported receiving specific contact information from partners they met on the apps, 48% of participants would always, 50% would sometimes, and 2% would never be able to contact these partners. The majority (73%) reported keeping track of men in the apps that they might want to chat with again, and 57% deleted their profile on an app in the last year.

Health Services on GSN Apps

Most participants (82%) were comfortable with apps allowing health department profiles to provide users with health services and information. Age, race/ethnicity, U.S. census region, and history of HIV/STD were not associated with being comfortable with a health department presence on apps. If health departments had profiles on GSN apps, 51% of participants would be more likely to use the app and 46% would be as likely to use the app. Participants would be more likely to believe a health department profile on an app was real if contact information for health department staff was provided (75%), the profile was verified by the app as being real (67%), and the profile picture included an official health department logo (53%). Figure 5.1 presents the health services that participants would use if offered by GSN apps.

DISCUSSION

Conducting HIV/STD partner notification and offering sexual health services on GSN apps were generally acceptable to participants. While the majority of participants preferred to be notified of exposure to HIV/STD by their partner directly, most would still get tested if they were notified by a health department profile or anonymous message in the app. The majority of participants

reported being comfortable notifying a partner of HIV/STD exposure using a health department profile or in-app messaging system, and half of the participants preferred receiving health department assistance or notifying through anonymous message. Offering a partner notification feature on the apps would not deter the vast majority of participants from using the apps. Most participants were comfortable with health departments having profiles on the apps and offering sexual health services.

About half of participants always receive enough contact information from partners met through apps for health department staff to be able to trace them through traditional methods, and on average, participants could find about two-thirds of their partners again today if they needed to. This differs from a report from a health department in New York that expressed that partners met on apps often cannot be contacted using traditional partner notification methods [26]. Even if participants do not have contact information for partners met through apps, results from our qualitative study suggest that partners are generally easy to find again on the apps unless the partner blocks them, deletes his profile, or changes his username. While finding a partner met through an app may pose less of a barrier to partner services than we expected, blocking and deleting profiles still hinder partner tracing. More than half of participants have deleted their profile on an app in the last year and participants block 15% of their partners on the app on average. Similarly, a study in Australia found that MSM often blocked a partner on an app and/or deleted contact information for him soon after sexual contact [81]. App-based partner notification methods can enhance the ability of app users and health departments to trace partners, but blocking and deleting profiles may still pose barriers.

Despite most participants wanting to be notified of HIV/STD exposure by their partner directly, the vast majority would still get tested if notified through a health department profile or anonymous message in the app. Similar to the in-app anonymous messaging system, inSPOT is a partner notification website that allows individuals to send anonymous electronic partner notification email cards. A study of inSPOT found that 77% of participants would test for an STD if notified through an anonymous email card. Our study found that participants were more likely to test if notified through a health department profile rather than an anonymous message, but both would yield high levels of testing. Similarly, some focus group participants in our qualitative study thought a partner notification message from a health department profile would have more credibility than an anonymous message. Those with a history of HIV or bacterial STD diagnosis (compared to those with no history) and those who were aged 35 and older (compared to those under age 35) were more likely to be comfortable receiving notification from a health department profile or an anonymous in-app message. Having potentially experienced partner notification first hand, those with a history of HIV/STD may see the benefit in learning about the exposure, regardless of how.

Half of participants preferred to notify their partners of HIV/STD exposure directly, but the other half preferred to notify using health department assistance or anonymous message. Our qualitative results indicated that the type of notification desired may depend on how close the participant is with the partner. An Australian study found that MSM preferred anonymous notification methods for casual partners who were predominantly met online or through apps [81]. Those with a history of HIV or bacterial STD diagnosis (compared to those with no history) were more likely to be comfortable sending notification through a health department profile or an anonymous in-app

message. Their experiences with partner notification may enable them to see a benefit in partner notification methods that do not reveal their identities.

Most participants were comfortable with a health department presence on GSN apps to offer sexual health information and services. This is consistent with other studies that have found that GSN apps are an acceptable place for sexual health education and counseling, links to HIV self-tests, and STD outbreak alerts [85,87–90]. The majority of participants would use in-app HIV/STD prevention features, and health departments would reach a large audience of MSM if they incorporated GSN apps into their HIV/STD prevention strategies.

This study had several important strengths. First, the survey question development was informed by focus group discussions with U.S. MSM, which ensured that it addressed relevant experiences. Second, cognitive interviews were conducted with the hypothetical partner notification scenarios to ensure the clarity of the scenarios and partner notification methods that were used to measure acceptability. Third, we oversampled participants of color to understand whether partner notification method acceptability differed by race/ethnicity, which we found that it did not. However, this study was not without limitations. First, the survey asked about partner notification methods hypothetically, which may not reflect whether they would use them in reality; although, a systematic review found that the actual acceptability of mobile phone-delivered interventions can be higher than hypothetical acceptability [93]. Second, the men who participated in the survey may not be representative of all U.S. MSM with respect to their views on app-based partner notification; however, data on non-respondents revealed that age and U.S. region were not associated with survey completion, and acceptability of app-based partner notification did not

differ by race/ethnicity. Third, acceptability of app-based partner notification strategies may depend on the type of partner or infection, and we did not assess these methods for different types of partners or infections. Our qualitative results indicate that app-based partner notification strategies may be more likely to be used among casual partners, but further investigation is needed.

Our results suggest that GSN app-based partner notification and sexual health services would be utilized by and are acceptable to U.S. MSM. GSN app companies and public health departments should work together to incorporate GSN apps into HIV/STD prevention efforts and partner services. Once app-based partner notification and sexual health services are available on GSN apps, future research should assess their uptake and effectiveness.

Table 5.1: Hypothetical Scenarios and Partner Notification Methods

Scenario 1: Imagine that you recently had anal sex without a condom with a guy you met on a dating/hookup app. It has been a few weeks since you had sex with him, and he just found out he has syphilis. He wants to tell you so that you can get tested and, if necessary, treated. You only chatted in the app, and he doesn't have any other contact information he can use to reach you. In the next three questions, rate how comfortable you would be with the following ways he could tell you that he may have exposed you to syphilis:	
Method A: **He sends you a message** in the app to let you know that he may have exposed you to syphilis and to encourage you to get tested.	☐ Very comfortable ☐ Somewhat comfortable ☐ Somewhat uncomfortable ☐ Very uncomfortable
Method B: The local health department has a profile on the app. You receive a message from a **health department profile** in the app from a health specialist. The health specialist tells you that you may have been exposed to syphilis and provides you with information on where you can get tested and treated. The health specialist does not tell you who exposed you.	☐ Very comfortable ☐ Somewhat comfortable ☐ Somewhat uncomfortable ☐ Very uncomfortable
Method C: You receive an **anonymous message** from within the app telling you that you may have been exposed to syphilis by another app user. The message states "one of your sex partners is concerned that they may have exposed you to syphilis and wanted to let you know so you can take care of yourself by getting tested and, if necessary, treated." You do not know who exposed you.	☐ Very comfortable ☐ Somewhat comfortable ☐ Somewhat uncomfortable ☐ Very uncomfortable
Please rank the ways described in the previous three questions that this partner could tell you about your possible exposure to syphilis from the one you would most like for him to use (1) to the one you would least like for him to use (3).	___ Method A: He tells you using his app profile ___ Method B: Health specialist tells you using health department profile ___ Method C: You receive an anonymous message in the app
Scenario 2: Imagine that you were just diagnosed with syphilis at an STD clinic. A few weeks ago, you had anal sex without a condom with a guy you met on a dating/hookup app. You only talked to him in the app and do not have any other contact information for him. A health specialist from your local health department contacts you to tell you that he or she can help you tell your sex partners that they may have been exposed to syphilis. In the next five questions, rate how comfortable you would be with the following ways of telling this partner that he may have been exposed to syphilis:	

Method 1: You find an old message from the partner in the app and send him a message using **your app profile**. You tell him that you just found out you have syphilis and let him know that he may want to get tested.	☐ Very comfortable ☐ Somewhat comfortable ☐ Somewhat uncomfortable ☐ Very uncomfortable
Method 2: You meet with the health specialist from your local health department. During the meeting, you hand the health specialist your phone and allow him/her to send the partner a message from the health department using **your app profile.** The message lets him know that he may have been exposed to syphilis and may want to get tested.	☐ Very comfortable ☐ Somewhat comfortable ☐ Somewhat uncomfortable ☐ Very uncomfortable
Method 3: You meet with the health specialist from your health department. The health specialist has a **health department profile** on the app that he/she can use to find the partner on the app to let him know that he may have been exposed to syphilis and to help him get tested. The health specialist won't provide any information about you.	☐ Very comfortable ☐ Somewhat comfortable ☐ Somewhat uncomfortable ☐ Very uncomfortable
Method 4: The app allows you to send anonymous, pre-written partner notification messages to any user. You find the partner in the app on your own and send him an **anonymous, pre-written partner notification message** to tell him that he may have been exposed to syphilis and may want to get tested.	☐ Very comfortable ☐ Somewhat comfortable ☐ Somewhat uncomfortable ☐ Very uncomfortable
Method 5: The app has a function that provides you with a list of guys you have chatted with on the app in the last 12 months, even if you have deleted or lost their messages. You select the partner from that list, which sends him an **anonymous, pre-written message** in the app that tells him that he may have been exposed to syphilis and may want to get tested.	☐ Very comfortable ☐ Somewhat comfortable ☐ Somewhat uncomfortable ☐ Very uncomfortable
Please rank the ways described in the previous five questions that you could tell this partner about his possible exposure to syphilis from the one you would most like to use (1) to the one you would least like to use (5).	___ Method 1: You tell the partner by sending a message through your profile ___ Method 2: Health specialist tells the partner by sending a message through the app using your profile ___ Method 3: Health specialist tells the partner by sending a message through the app using the health department profile ___ Method 4: Send an anonymous, pre-written

	message to the partner by finding the partner in the app on your own ___ Method 5: Send an anonymous, pre-written message to the partner using the list provided to you by the app

Table 5.2: Characteristics of survey respondents[1]

	Respondents N=791 n (%) or Median (IQR)
Demographic factors	
Age	28 (21, 45)
Race	
Non-Hispanic White	407 (53)
Non-Hispanic Black	96 (13)
Hispanic	211 (28)
Other	45 (6)
U.S. Census Region	
Northeast	120 (15)
Midwest	149 (19)
South	313 (40)
West	209 (26)
Highest Education Level	
Less than college	142 (18)
Some College/2-year degree	295 (37)
4-year degree	188 (24)
More than 4-year degree	165 (21)
Relationship Status	
Single	498 (64)
Boyfriend/Partner/Spouse	264 (34)
Triad	19 (2)

HIV/STD Testing	
Ever tested for HIV	670 (85)
HIV tests in last 2 years[2]	2 (1, 4)
HIV Status[2]	
Negative	561 (83)
Positive	100 (15)
Don't Know	11 (2)
Ever diagnosed with chlamydia, gonorrhea, or syphilis	210 (27)
Substance Use and Sexual Behavior – Last 12 Months	
Injected drugs	25 (3)
Used Meth	21 (3)
Used Poppers	253 (32)
Received money for sex	57 (7)
Paid money for sex	53 (7)
No. sex partners in the last year	5 (3, 12)
No. sex partners sex without a condom in last year	2 (0, 3)
Use of Geosocial Networking Apps – Last 12 Months	
Apps Used:	
Grindr	659 (83)
Scruff	295 (37)
Tinder	289 (37)
Adam 4 Adam RADAR	192 (24)
Jack'd	184 (23)
GROWLr	130 (16)
Hornet	118 (15)
Daddyhunt	72 (9)
Mr. X	18 (2)
GuySpy	17 (2)
Looking For:	
Sex/Hookups	682 (86)
Dates	427 (54)
Killing time	421 (53)
Friends	400 (51)
Relationship	397 (50)
Networking	158 (20)
Gym buddies	65 (8)

[1] Observations were excluded if participants preferred not to answer a question
[2] Among those who had ever had an HIV test

Table 5.3: Acceptability of app-based partner notification methods among 791 U.S. MSM who met sex partners using geosocial networking apps

Methods of being notified by a partner diagnosed with syphilis	Comfortable with:	Would most like for partner to use:	Mean rank (1-3)[1]
Method A: He tells you using his app profile	77 %	70 %	1.4
Method B: Health specialist tells you using health department profile	57 %	20 %	2.0
Method C: You receive an anonymous message in the app	41 %	10 %	2.6
Methods of notifying a partner if you were diagnosed with syphilis	Comfortable with:	Would most like to use:	Mean rank (1-5)[2]
Method 1: You tell the partner by sending a message through your app profile	65 %	50 %	2.4
Method 2: Health specialist tells the partner by sending a message through the app using your profile	49 %	8 %	3.4
Method 3: Health specialist tells the partner by sending a message through the app using the health department profile	71 %	18 %	2.7
Method 4: Send an anonymous, pre-written message to the partner by finding the partner in the app on your own	68 %	6 %	3.2
Method 5: Send an anonymous, pre-written message to the partner using the list provided to you by the app	74 %	18 %	3.3

MSM, men who have sex with men

[1]From most like for partner to use (1) to least like for partner to use (3)

[2]From most like to use (1) to least like to use (5)

Table 5.4: Ability to Re-contact Partners Met on Geosocial Networking (GSN) Apps in the Last 12 Months

	Respondents N=791 n (%) or Median (IQR)
Partners Met Through GSN Apps	
No. sex partners met through GSN apps	4 (2, 10)
Mean proportion of male sex partners met on GSN apps	79%
Among male sex partners met on GSN apps, the mean proportion:	
Sex with more than once	49%
Able to contact again if tried today	68%
Blocked on the app	15%
Contact Information Given to Partners Met on GSN Apps	
Ability to be contacted by partner[1]	
Always contactable	403 (51)
Sometimes contactable	377 (48)
Never contactable	11 (1)
Always Give:	
First and last name	219 (28)
Phone number	266 (34)
Email address	84 (11)
Home address	148 (19)
Where you work	113 (14)
Social media handle/profile name	173 (22)
Never Give:	
First and last name	64 (8)
Phone number	101 (13)
Email address	642 (69)
Home address	320 (41)
Where you work	391 (50)
Social media handle/profile name	282 (36)
Contact Information Received from Partners Met on GSN Apps	
Ability to contact a partner[1]	
Always contactable	382 (48)
Sometimes contactable	394 (50)
Never contactable	15 (2)
Always Receive:	
First and last name	211 (27)
Phone number	288 (36)
Email address	83 (10)
Home address	140 (18)
Where you work	135 (17)

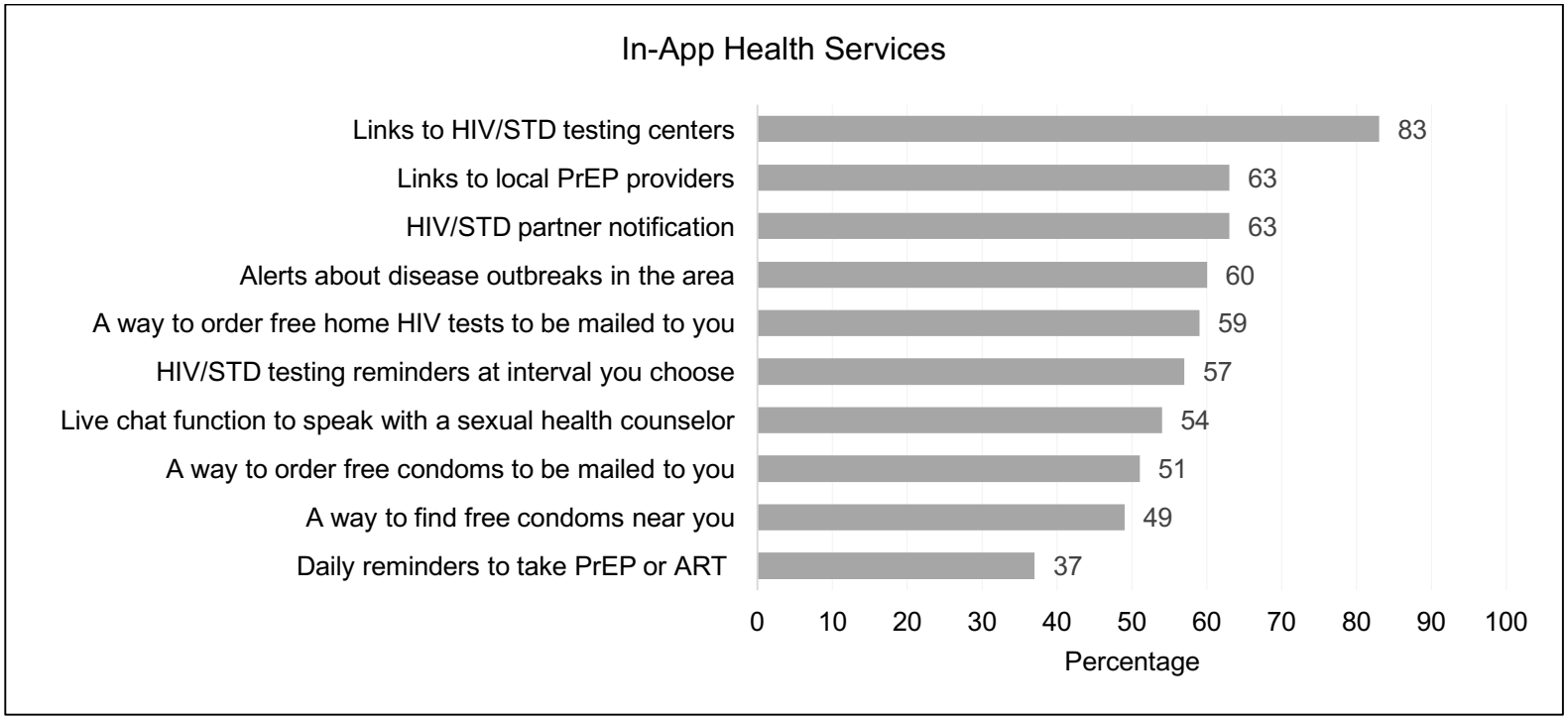
Social media handle/profile name	177 (22)
Never Receive:	
First and last name	34 (4)
Phone number	76 (10)
Email address	512 (65)
Home address	231 (29)
Where you work	296 (38)
Social media handle/profile name	246 (31)
Facilitators and Barriers to Finding Men on GSN Apps	
Keep track of men in the app	556 (73)
How they keep track:[2]	
Save other contact information	356 (64)
'Favorite' in the app	347 (62)
Save chats in the app	311 (56)
Take screenshots of profiles	127 (23)
Save usernames	117 (21)
Other	21 (4)
Deleted app profile	443 (57)
Why they deleted their profile:[3]	
Tired of using the app	260 (59)
No longer looking for other partners	191 (43)
Did not want other people to see them on the app	131 (30)
Did not want former sex partner to be able to contact them	53 (12)
Other	42 (9)

[1]Contactable is defined as having at least one of the following pieces of information: first and last name, phone number, email address, home address, work address, or social media profile name

[2]Among those who keep track of men in the app

[3]Among those who deleted their profile

Figure 5.1: Percentage of participants that would use various health services if offered in GSN apps



GSN, geosocial networking; PrEP, pre-exposure prophylaxis; ART, antiretroviral therapy

CHAPTER 6: Conclusion

This dissertation defined and addressed the barriers to HIV/STD partner services in Kenya and the U.S. Chapter 2 identified key barriers to HIV PS in Kenya and provided recommendations to HTC counselors in how to increase uptake of PS. Chapter 3 highlights that the effectiveness and safety of HIV PS do not differ based on a history of IPV, which support the inclusion of those reporting past IPV in PS while closely monitoring adverse events. Chapters 4 and 5 provide recommendations for the incorporation of HIV/STD partner notification into GSN apps, guided by qualitative and quantitative data from MSM across the U.S. Our results suggest that GSN app-based partner notification and sexual health services would be utilized by and are acceptable to U.S. MSM.

Chapter 2: Understanding Barriers to Scaling Up HIV Assisted Partner Services in Kenya

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Chapter 2 identified key barriers to the uptake of HIV PS in Kenya. Some index patients may need more time to digest their HIV test results before being willing to provide partner information. The rapport between the HTC counselor and the index patient can be a facilitator or barrier to elicitation of partner contact information. Lack of trust in the HTC counselor and a fear of breaches of confidentiality led many index patients to decline PS. The type of relationship the index patient has with his or her partner may influence partner notification strategy desired, and some index patients may prefer alternate methods of notifying partners. In addition, the lack of community awareness about HIV PS may make individuals feel less comfortable naming partners. To improve uptake of HIV PS as the program is scaled up, the results of Chapter 2 support:

- Establishing trust between HTC client and index patient and ensuring confidentiality
- Encouraging the same HTC counselor to go through the entire process with the index patient from testing to eliciting partner contact information to establish a rapport
- Offering alternative methods of disclosure to accommodate different relationships
- Spreading awareness about HIV PS in the community

The rapport between the HTC counselor and the index patient was the lynchpin in the decision to accept or decline PS. Since this relationship is such an important one, future research should investigate strategies that HTC counselors can use to build trust with index patients in a low-resource setting. A U.S. study found five ways to build trust between providers and HIV patients: 1) provide reassurance to patients, 2) tell patients it is okay to ask questions, 3) show patients their lab results and explain what they mean, 4) avoid language and behaviors that are judgmental of patients, and 5) ask patients what they want in terms of treatment goals and preferences [94]. Building trust may be different in different contexts, and future research should identify specific strategies that will work for HIV patients in a busy clinic in Kenya.

We were not able to capture the variation of responses in demographic characteristics such as age or socioeconomic status, and future research should investigate whether reasons for declining PS may be different based on demographic characteristics. Understanding how barriers differ based on patient characteristics could inform strategies on how to optimize partner elicitation based on the patient.

Chapter 3: HIV Assisted Partner Services Among Those With and Without a History of Intimate Partner Violence in Kenya

Chapter 3 reported that PS effectiveness and risk of relationship dissolution do not differ between those with and without a history of IPV. Taking into account the exclusion of those who experienced IPV in the month prior to enrollment and the challenges in measuring IPV, our results suggest that HIV PS is an effective and safe partner notification strategy for index patients with a history of IPV in Kenya. As PS is scaled up in different contexts, these data support including those reporting past IPV and closely monitoring adverse events and positive outcomes.

Our study uncovered some challenges with the measurement of IPV. Participants may have failed to disclose a history of IPV at baseline and reported their history at follow-up instead, and it is not clear if those who reported ever experiencing IPV at follow-up were reporting IPV that occurred during or before the study. The inability to determine the timing of some of the reported IPV prevented the Chapter 3 analysis from investigating incident IPV as a social harm outcome in the main analyses. IPV is a complex issue that is often not fully captured in traditional questionnaires. The WHO states that gold standard methods of measuring IPV ask direct questions about experiences of specific acts of violence over a defined period of time as opposed to generic questions about broad abuse [33]. Study participants often underreport IPV due to normalizing their IPV experiences, trouble recalling events after experiencing trauma, or fear of repercussions from their perpetrator [72]. To minimize underreporting, a study found that providing respondents with multiple opportunities to disclose history of IPV during an interview allowed them to remember events and to make the decision to report them [73]. Our study asked about IPV broadly,

and respondents may be more likely to disclose IPV if asked about specific experiences while provided with multiple opportunities to disclose history of IPV.

After excluding index clients who were potentially at highest risk of experiencing adverse events during the study, there is some uncertainty about the generalizability of our results. Epidemiology methodologists instruct that results of randomized trials are directly generalizable to study-eligible participants who would have chosen to enroll in the study [95–97]. The needed data on IPV and APS could be collected within demonstration projects of APS in Kenya in future research. Given that there are ethical concerns about including IPV survivors in randomized trials, this association may be better observed in an evaluation of a program that has already been implemented. The APS study monitored social harms over the course of the 3 months after an index client enrolled. IPV has been found to be episodic and unpredictable, and incident IPV may be better studied over a longer period of time [98]. Evaluating the public health impact of a demonstration project would allow for longer follow-up. Prior to receiving APS, index patients should be screened for IPV in a questionnaire that asks about specific acts of violence over a defined period of time. Those with a history of IPV should receive monitoring from HTC counselors, and reports of social harms should be documented to further evaluate the safety of APS.

In addition to collecting data on IPV in demonstration projects, there is a need for qualitative data on APS and IPV. To address concerns related to IPV in APS recipients, it would be beneficial to conduct focus groups with HIV-positive IPV survivors. Within these focus groups, investigators could explore IPV survivors' preferences and experiences of disclosing to a partner, which could help to guide the way HTC counselors approach partner notification if an index patient experienced recent IPV.

Investigators from other APS studies in sub-Saharan Africa have concluded that concern about IPV should not hinder the scale-up of APS [11,70]. As of now, there is no evidence that APS increases the risk of IPV. Considering that those at highest risk of IPV may have either chosen not to participate in the research or were excluded as a result of recent IPV, APS programs should not ignore the potential risk of IPV after partner notification. During the APS study, partners received counseling after they were notified of exposure to HIV, and this counseling may have helped to minimize the risk of conflict with the index patient. The study also provided monitoring every 10 days for index patients with a history of IPV, and if any IPV events were reported, the index patients were referred to IPV services. Both the partner counseling and IPV monitoring may have contributed to the low frequency of IPV during the study.

The findings from Chapter 3 emphasize that special monitoring needs to be provided for IPV survivors receiving APS. Our correlates analysis showed that those with a history of IPV may be at an increased risk of relationship dissolution as a result of HIV disclosure, but we found that this risk was similar for those who received and did not receive APS. In Chapter 2, fear of IPV was commonly stated as a reason for declining APS. The stability of an index patient's relationship had an impact on his or her decision to accept APS. A key theme that arose from that analysis is that alternative methods of notification may need to be offered to an index patient depending on the context. IPV survivors may need to be provided with additional notification options and receive more protection.

Chapter 4: Attitudes Around Using Geosocial Networking Applications for HIV/STD Partner Notification

Chapter 5: Acceptability of Using Geosocial Networking Applications for HIV/STD Partner Notification and Sexual Health Services

Both the qualitative findings in Chapter 4 and quantitative findings in Chapter 5 conclude that U.S. MSM are generally comfortable with HIV/STD partner notification being conducted through GSN apps. Both chapters report that MSM prefer to be notified of HIV/STD exposure directly, but the general sentiment was that they wanted to find out about the exposure in whatever way possible. The vast majority would still get tested if notified through a health department profile or anonymous message in the app. While MSM overwhelmingly expressed a responsibility to notify a partner of HIV/STD exposure themselves in the qualitative study, only half of participants in the online survey reported preferring to notify a partner using their own profile. Participants may have felt less comfortable saying they would prefer to notify anonymously while in the focus groups compared to the online survey. The qualitative results indicate that MSM may like the idea of notifying casual partners met through apps anonymously through a health department profile or anonymous messaging system.

Chapters 4 and 5 both report that U.S. MSM are generally comfortable with a health department presence on GSN apps, but the qualitative study underlined that MSM from geographic areas politically hostile to gay men may be wary of the presence of a local health department on GSN apps. If health departments are on apps, it will be essential that they provide accurate health information and are supportive of the LGBTQ community to gain the trust of app users. The majority of participants would use in-app HIV/STD prevention features, and health departments

would reach a large audience of MSM if they incorporated GSN apps into their HIV/STD prevention strategies.

It will be important to include app owners in each stage of the research and implementation of HIV/STD partner notification to ensure the success and sustainability of the intervention. Incorporating HIV/STD partner notification and sexual health services into GSN apps will need a streamlined approach to communication with app owners. App owners receive a considerable number of requests from public health departments to conduct outreach and partner notification through their apps [61]. In addition, app owners want a way to verify that the agencies that want to conduct partner notification are authentic. When apps are overwhelmed with too many requests and do not know which ones are legitimate, they may be less likely to want to be involved. In engaging app owners in GSN app PS, it will be important to establish a spokesperson or group for the intervention so it is clear whom app owners will coordinate with.

Beyond communication with app owners, it will be important to design a partner notification strategy that works for them. Public health departments must keep in mind that app owners are running a business, and they are not likely to support any strategies that conflict with their business interests. App owners have valuable knowledge about how their app works, and including them in the research and implementation allows us to gain knowledge about the capabilities of their app [99].

As app-based PS is scaled up, the CDC should collect data from health departments to evaluate the intervention's effectiveness. CDC recommended specific process and evaluation questions in a recent IPS toolkit [100]. An important indicator that many health departments fail to collect is the total number of partners an index patient has, regardless of locating information.

That information will be necessary to get an accurate denominator of total number of partners mentioned by an index patient.

Aside from engaging health department officials, app owners, and the MSM community in the scale up of this intervention, it will also be important to inform other health departments, community clinics, private physicians, and other places local MSM seek health care. When a partner is notified through an app that he may have been exposed to HIV/STD, he may be skeptical and call his regular physician to confirm that the message is valid. It is important that the other medical professionals in the community are aware that partner notification is being conducted through apps so they can verify to their patients that the message is valid. Spreading awareness in the MSM community about partner notification through apps may also help to reduce the skepticism partners may feel when they receive notification messages on the app. If receiving notification through an app becomes normalized, partners may be even more likely to seek out HIV/STD testing.

Summary

HIV/STD PS are an important targeted prevention strategy in the control of the HIV and STD epidemics. This dissertation defined the barriers to PS in Kenya and the U.S. and provided specific recommendations for overcoming those barriers. In Kenya, it will be important to build trust between HTC counselors and index patients and offer alternative methods of notification for those who need them. Those with a history of IPV may be at higher risk of relationship dissolution, and they should be monitored for adverse events after partner notification. Incorporating

HIV/STD prevention strategies, such as partner notification, into GSN apps is acceptable to U.S. MSM and has the potential to overcome barriers that traditional methods face in tracing partners.

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