Pre-Exposure Prophylaxis Knowledge and Perceived Effectiveness to Prevent HIV Among Deaf Gay, Bisexual, and Queer Men

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Abstract

Purpose: There have been recent advances to the adoption of pre-exposure prophylaxis (PrEP) as an effective human immunodeficiency virus (HIV) preventive treatment among men who have sex with men, but PrEP services and resources are often not accessible to those who are deaf and use American Sign Language (ASL). This article investigates PrEP knowledge among deaf gay, bisexual, and queer (GBQ) men and the contribution of social support to their perceptions regarding the effectiveness of PrEP at preventing HIV.

Methods: An online health survey in ASL and English included questions about sexual orientation, HIV testing, PrEP knowledge and perceived effectiveness at preventing HIV, coming out to healthcare providers, and social support. We gathered data from 121 deaf GBQ men recruited from diverse cities in the United States, with 87% self-identifying as gay. Logistic regression analyses were used to examine the relationships between self-reported level of social support and perceived effectiveness of PrEP at preventing HIV after controlling for sociodemographic and health-related variables.

Results: There was a significant relationship between meeting new lesbian, gay, bisexual, transgender, and queer (LGBTQ) friends online and PrEP knowledge ($\chi^2 = 14.93$; $p < 0.001$). After controlling for sociodemographic and health-related variables, those who discussed LGBT-related issues online and/or on a social networking site regularly were threefold more likely to perceive PrEP as being effective at preventing HIV than those who did not engage in online discussions (odds ratio = 3.12; 95% confidence interval: 1.12–8.75).

Conclusion: For deaf GBQ men, PrEP knowledge might be attained through meeting and making new LGBTQ friends online. Active engagement in online discussions about LGBT-related issues might enhance perceptions regarding the effectiveness of PrEP to prevent HIV.

Keywords: deaf, gay, GBQ, health disparities, HIV, PrEP

Introduction

PRE-EXPOSURE PROPHYLAXIS (PrEP) is very effective for preventing human immunodeficiency virus (HIV), particularly among men who have sex with men (MSM). The U.S. Centers for Disease Control and Prevention (CDC) recommend “that clinicians evaluate their male and female patients who are sexually active or who are injecting illicit drugs and consider offering PrEP as one prevention option to those whose sexual or injection behaviors and epidemiologic context place them at substantial risk of acquiring HIV infection.”¹ There have been increasing efforts to promote HIV awareness among MSM through mass media and eHealth platforms, including web-based tools, social networking sites, and videos.² However, many health websites

that include English text are not fully accessible to people who are less fluent in English, including deaf people. Although some deaf people are bilingual users of both languages, many deaf people are more proficient in American Sign Language (ASL) than English. Unfortunately, some of these ASL-using deaf people also have weak health literacy, which can make it difficult to navigate and find health-related ASL videos on the Internet.³ This presents a serious problem for some deaf gay, bisexual, and queer (GBQ) men with low PrEP awareness, and who might also be at risk for HIV infections. If these at-risk deaf individuals are not able to access health information successfully on the Internet, they are likely to miss out on critical information, resources, and social support that are essential for PrEP awareness and literacy.

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When a deaf person has poor health literacy and experiences social challenges with accessing health information, this deaf person is at greater risk for poor health outcomes, including food insecurity, mental health problems, and poor preventive care.^{4–7} In a recent study of 171 deaf young adults 18–29 years of age, enacted stigma toward deaf people was found to be associated with higher self-reported depressive and anxiety symptomatology.⁸ Those who self-identified as lesbian, gay, or bisexual reported significantly higher depressive and anxiety symptoms compared to their heterosexual counterparts.

Critical health literacy (CHL) is defined as the ability to integrate and apply health information to make and take appropriate health-related decisions and actions.⁹ A study found that among deaf and hearing college students, hearing college students' CHL was linked to their participation in health-related discussions with both families and friends.¹⁰ However, for the deaf young adult population, their discussions about health with friends, but not with families, were significantly associated with higher CHL.¹⁰ Therefore, the finding that many deaf people might be more dependent on their friends than on their families for health information and literacy suggests that information that channels through family communities might not suffice for many deaf people. Deaf GBQ men, who are members of two minority groups, are especially at risk for not being able to access sufficient social support and healthcare to prevent HIV.

Although research on MSM in the general population is expanding rapidly, deaf men are rarely or never included in their sample or analysis. In addition, to this date, only one conference abstract¹¹ and one published study¹² on deaf MSM have focused specifically on HIV-related behaviors. One study involved 20 in-depth, online qualitative interviews in ASL with 15 deaf MSM participants and 5 deaf key informants.¹¹ Recurrent factors that contributed to the HIV testing behaviors among deaf MSM included communication with healthcare providers, infantilization and desexualization of deaf people, limited access to spoken information, feelings of fear and isolation, challenges with anonymity, mental health issues, and providers' cultural competence.¹¹ Iantaffi et al.¹¹ concluded that deaf MSM encounter many significant barriers in accessing HIV testing, prevention, and education. The second study reviewed the literature on HIV-related behaviors among deaf individuals; it was found that deaf MSM were more vulnerable to HIV infection due to the discrimination and stigma that they experienced based on their hearing status and sexual orientation.¹²

A study described PrEP's effectiveness as HIV prevention treatment as "dependent" on people's awareness of the treatment itself.¹³ The Preexposure Prophylaxis Initiative (iPrEx) trial, which was the first human testing of PrEP initiated in 2010, established that PrEP effectively reduced the risk of HIV transmission.¹⁴ However, a post-iPrEx survey conducted in 2011 revealed that only 19% of over 3000 HIV-negative men had heard of PrEP.¹⁵ In 2015, a national survey of 880 gay and bisexual men found that those who believed they were appropriate candidates for the treatment had a higher likelihood of intending to use PrEP, as opposed to those who were unsure if they were appropriate candidates.¹⁶ Clearly, being aware of PrEP's functions in terms of reducing HIV infections and understanding how one might be a candidate for the treatment are crucial to active participation in preventive sexual healthcare. If a person is not aware of or does not understand how PrEP contributes to HIV prevention as treatment, then this person is not likely to utilize PrEP and

may subsequently be at a higher risk for HIV transmission. For MSM who are deaf and already face barriers, PrEP awareness can be even more challenging.

In a national survey conducted with young adult MSM between July 2012 and January 2013, ~27% had heard of PrEP with half having learned about this option through the media.¹⁷ A 2014 implementation study of National HIV Behavioral Surveillance among MSM in San Francisco found that White men were more than four times as likely as non-White men to use PrEP.¹⁸ This study also found higher PrEP usage among those who were older.¹⁸ Another study in 2015 noted that the majority of 573 MSM respondents demonstrated PrEP knowledge by answering correctly three of four questions related to PrEP: consistent adherence (85%), continued condom use (93%), and sexually transmitted infection (STI) prevention (84%).¹⁹

Although it is clear that there have been advances to the adoption of PrEP as an effective HIV preventive treatment among MSM, these services and resources are not always accessible to those who are deaf and use ASL. In addition, historical and ongoing discrimination associated with being deaf, stigma, and communication barriers play a large part in deaf GBQ men accessing sexual health information and receiving quality care and treatment.^{8,11,12}

Therefore, this article aims to (1) document the prevalence of PrEP knowledge among deaf GBQ men, and (2) examine deaf GBQ men's perceptions of PrEP's effectiveness at preventing HIV. Given that social factors and stigma affect health among MSM and those who are deaf, the hypothesis is that social factors may be associated with deaf GBQ men's perceptions of PrEP's effectiveness at preventing HIV. Moreover, because deaf adults generally strengthen their health knowledge and literacy through participation in health-related discussions with friends,¹⁰ this article also aims to (3) investigate the relationship between self-reported level of social support and deaf GBQ men's perceptions regarding the effectiveness of PrEP.

Methods

Procedure

Following institutional review board approval by Gallaudet University, the research staff recruited deaf community members who used ASL through national channels. Recruitment methods included snowball sampling through personal networks,²⁰ distribution of flyers, and advertisements on deaf-centered organizations' websites and e-newsletters. Communication between the research staff and participants occurred through accessible channels, including mail, email, social media, and video chat programs. In a larger study from which secondary data for this article were drawn, only those who self-reported using ASL as their primary language were included because this group was identified as a medically underserved group^{7,21,22}; exclusion criteria included being younger than 18 years or having unilateral hearing loss. For the purpose of this article, respondents who self-identified as male and GBQ were included in the analyses.

After the participant viewed the information in ASL and English online, the participant was directed to a page where they could choose to provide consent to participate or decline. Following consent, the fully accessible ASL-English online survey took ~1 hour to complete. Each participant received a \$25 gift card for participating in the study. If the participant

met with the research staff remotely, ASL instructions were given through a videoconferencing method and a URL survey link was e-mailed to the participant. The research staff remained visible to the participant through videoconferencing and was readily available to answer questions or troubleshoot as the participant progressed through the consent document and survey. For on-site survey administration, the research staff stayed in the interview room with the participant. If the participant did not feel comfortable watching the ASL question as signed on the prerecorded video, a research staff repeated and signed the question for the participant. For some participants, such as those with low vision or who did not feel comfortable with self-administration on a computer, the research staff signed all the questions and response options and recorded the participants' responses on the computer. No names or identifying information were included in the online survey and a unique identifier was used to avoid storing personal information in the same online survey dataset. The identifying information was stored in a separate database that was accessible only to the principal investigator.

Survey items

The health survey, which included items relevant to this article, was administered to a nationwide sample of 435 deaf adults from October 2017 to March 2018. Within this sample, 121 were deaf GBQ men. Before survey administration, all items were translated into ASL, tested through cognitive interviews with deaf adults, and the final translations were captured on film.²³ The survey collected the following demographic information: age (categorized as 18–34, 35–49, and 50+), age when coming out, race/ethnicity, sexual orientation identity, education (high school, some college, and college graduate), and region (Northeast, South, Midwest, and West).

For race and ethnicity, we asked “What is your race?” with 15 response options and “Are you of Hispanic, Latino/a, or Spanish origin?” with response options of “No, not of Hispanic, Latino/a, or Spanish origin”; “Yes, Cuban”; “Yes, Mexican, Mexican American, Chicano/a”; “Yes, another Hispanic, Latino/a, or Spanish origin”; and “Yes, Puerto Rican.” Due to the small number of GBQ men participants belonging to each category, race/ethnicity was dichotomized as White versus non-White in the analyses. Sexual orientation was assessed with the question, “What is your sexual orientation?” with response options of “Gay,” “Lesbian,” “Heterosexual,” “Bisexual,” “Asexual,” “Queer,” and “Other, please specify.” For coming out age, participants were asked “How old were you when you first told a close friend or family member that you were, or might be LGBTQA+, or hasn't this come up?” with response options of “Insert age,” “This hasn't come up,” and “Does not apply.”

Whether a participant had ever had an STI was assessed with the question “Have you ever had a sexually transmitted disease? If yes, once or more than once?” and response options were “Once,” “More than once,” and “Never.” A question about HIV testing was asked as follows: “When was the last time that you were tested for HIV?” Response options were, “Less than 3 months ago,” “In the past year,” “More than 1 year ago,” and “I have never been tested for HIV.”

New items related to PrEP, lesbian, gay, bisexual, transgender, and queer (LGBTQ) social support, and online or social networking site use to discuss LGBT-related issues were

developed, translated, and tested in cognitive interviews with LGBTQ participants who offered feedback to improve the items. These items were then finalized and included in the online survey. PrEP knowledge was assessed with the question “A medicine to prevent HIV infection is available and is called the PrEP, pre-exposure prophylaxis. Before today, have you ever heard of the PrEP?” Response options were “Yes” and “No.” Participants were also asked, “In your opinion, how successful is the PrEP medicine at preventing HIV infection?” Response options were “Not at all successful,” “A little successful,” “Pretty successful,” “Very successful,” and “Don't know.” For the purpose of logistic regression analyses that required a binary outcome, “Pretty successful” and “very successful” response options were recoded as 1 and the remainder of the response options were recoded as 0.

Social support was assessed with the question, “People who are close to me accept me as a person who is LGBTQ.” Response options were, “Never,” “Rarely,” “Sometimes,” “Often,” and “Always.” Whether a participant had LGBTQ self-identified friends was assessed with the question, “I have friends who are like me and can understand what it is like to be LGBTQ,” with response options, “Never,” “Rarely,” “Sometimes,” “Often,” and “Always.” Meeting new LGBTQ friends online and/or through a social networking site was assessed with the question, “Have you met new LGBTQ friends online or through a social networking site, or have you never done this?” with response options of “No, never done this,” “Yes, but not in past 12 months,” and “Yes, in past 12 months.” Active participation in LGBT-related discussion online was assessed with the question, “Do you regularly discuss LGBT-related issues online or on a social networking site?” with response options of “Yes regularly discuss LGBT issues” and “No, do not regularly discuss LGBT issues online.” Participants were asked the following question about their experience with healthcare providers: “How open (‘out’) are you regarding your sexual orientation and/or gender identity with healthcare providers?” with response options of “Not open,” “Somewhat open,” and “Very open.”

Statistical analyses

Descriptive statistics, including chi-square and *t*-tests, were used to summarize the sample characteristics. The level of significance was set at $p < 0.05$. Unweighted descriptive statistics, such as cross-tabulation and percentage procedures, were used to describe the sample. As a dichotomous outcome was modeled, logistic regression analyses were used to examine the relationship between self-reported social support and perceptions regarding the effectiveness of PrEP after controlling for sociodemographic (age, education, and race/ethnicity) and health-related (ever had an STI, HIV testing, and disclosure to healthcare providers) variables. SPSS version 25.0 (IBM Corp., Armonk, NY) was used for all analyses.

Results

Prevalence of PrEP knowledge

The sample included 121 GBQ men 18–75 years of age (64% White; 87% gay) (Table 1). Thirty-eight percent of this sample had a high school degree or some college education and 50% were 18–34 years of age. When asked about whether they had ever had an STI, 49 (40%) participants reported that they had an STI once or more than once.

TABLE 1. OVERALL SAMPLE CHARACTERISTICS (N=121)

Characteristics	n	% ^a
Age group		
18–34	60	50
35–49	42	35
50+	19	16
Race/ethnicity		
White	77	64
Non-White	44	36
Sexual orientation identity		
Gay	105	87
Bisexual	9	7
Queer	7	6
Education		
High school	12	10
Some college	32	28
College graduate	71	62
Missing	6	
Region		
Northeast	19	16
South	50	41
Midwest	15	12
West	37	31
Ever had STI		
Once	21	17
More than once	28	23
Never	72	60
Last time tested for HIV		
<3 Months ago	37	31
In the past year	31	26
>1 Year ago	42	35
Never been tested	11	9

^aPercentages may not add up to 100% exactly due to rounding.

HIV, human immunodeficiency virus; STI, sexually transmitted infection.

As seen in Table 2, a majority (85%) of the participants had heard of PrEP before taking the survey. Age was associated with PrEP knowledge, with a higher percentage of awareness among participants 18 to 34 years of age ($\chi^2=8.66$, $p<0.05$). Eleven participants (9%) reported that they had never been tested for HIV and slightly more than half of this never-been-tested subsample ($n=6$; 55%) had never heard about PrEP. No significant differences in PrEP knowledge emerged across race/ethnicity, education, and region.

There was a significant relationship between meeting new LGBTQ friends online and PrEP knowledge ($\chi^2=14.93$; $p<0.001$). A high majority (105/120; 88%) of respondents had met new LGBTQ friends online either within the past 12 months or more than a year ago, and nearly 90% (95/105) of these respondents who had met new LGBTQ friends online reported that they had heard about PrEP. On the contrary, 12% (15/120) of the sample in this study had never made new LGBTQ friends online, and nearly half (7/15) of these participants had never heard of PrEP.

Social support and perceived effectiveness at preventing HIV

Another set of analyses was conducted on the sample of 103 GBQ respondents (65% White; 89% gay) who answered “yes” to the question about having heard about PrEP. Just

over half of this sample that had heard of PrEP were college graduates (62%) and were between 18 and 34 years of age (52%). As shown in Table 3, 66% of those who had heard of PrEP believed that it was effective at preventing HIV.

There were significant differences across HIV testing, participation in discussions about LGBT-related issues online and/or on a social networking site, and disclosure of sexual orientation/gender identity to healthcare providers. Among GBQ participants who were tested for HIV <3 months ago ($n=34$), a high majority ($n=29$; 85%) believed that PrEP was either pretty or very effective, whereas 51% of 37 GBQ participants who were tested more than a year ago believed that PrEP was a little effective or did not know about its effectiveness. The disclosure of sexual orientation/gender identity to healthcare providers was significantly associated with the deaf GBQ men’s perceptions regarding the effectiveness of PrEP ($\chi^2=3.85$; $p<0.05$). Perceptions regarding the effectiveness of PrEP to prevent HIV did not vary across age, age when coming out, race/ethnicity, sexual orientation identity, education, region, ever having an STI, LGBTQ acceptance by people close to the respondent, having LGBTQ friends, or meeting new LGBTQ friends online.

Among those who regularly discussed LGBT-related issues online or on a social networking site, 83% perceived PrEP to be effective at preventing HIV. In contrast, only 55% of those who did not discuss LGBT-related issues online believed that PrEP was effective at preventing HIV. After controlling for sociodemographic and health-related variables in a logistic regression analysis, those who discussed LGBT-related issues online and/or on a social networking site regularly were threefold more likely to perceive PrEP as being effective at preventing HIV than those who did not engage in online discussions about LGBT-related issues (odds ratio=3.12; 95% confidence interval: 1.12–8.75).

Discussion

This is the first nationwide study to document the prevalence of deaf GBQ men’s PrEP knowledge, which was quite high at 85% regardless of race/ethnicity, education, and region. Many participants in this study felt well supported as a GBQ person. Our study shows that deaf GBQ men who had more recent HIV testing and disclosed their sexual orientation and/or gender identity to their healthcare providers had greater understanding of PrEP effectiveness than deaf GBQ men who did not have recent HIV testing or had not disclosed their sexual orientation and/or gender identity to their healthcare providers. These findings clearly indicate the benefits for those who already are able to interact effectively with the healthcare system, and for those who obtain healthcare services from providers to whom they could be open about their sexual orientation/gender identity. However, among deaf GBQ who did not believe PrEP to be effective at preventing HIV, 54% had not had an HIV test within the last year and 42% were not very open with their healthcare providers about their sexual orientation and/or gender identity. These findings may be consequences of not being able to interact effectively with the healthcare system and not receiving services from providers who are trained to work with LGBTQ patients.

A number of studies have detailed the influence of interpersonal stigma on PrEP usage, but none has investigated the influence of stigma on deaf GBQ men’s PrEP knowledge. MSM have reported that some of their reluctance to use PrEP stems

TABLE 2. UNWEIGHTED SAMPLE CHARACTERISTICS BY KNOWLEDGE OF PRE-EXPOSURE PROPHYLAXIS (N=121)

Characteristics	Group				t-test; p
	Never heard of PrEP n= 18 (15%)		Heard of PrEP n= 103 (85%)		
	Mean (SD)		Mean (SD)		
Age when coming out	17 (14.72)		17 (6.35)		NS
	n	%	n	%	Chi-square; p
Age group					8.66; <0.05
18–34	6	10	54	90	
35–49	5	12	37	88	
50+	7	37	12	63	
Race/ethnicity					NS
White	10	13	67	87	
Non-White	8	18	36	82	
Sexual orientation identity					6.73; <0.05
Gay	13	12	92	88	
Bisexual	4	44	5	56	
Queer	1	14	6	86	
Education					NS
High school	2	17	10	83	
Some college	5	16	27	84	
College graduate	10	14	61	86	
Missing	1	—	5	—	
Region					NS
Northeast	4	21	15	79	
South	6	12	44	88	
Midwest	4	27	11	73	
West	4	11	33	89	
Ever had STI					6.92; <0.05
Once	3	14	18	86	
More than once	0	0	28	100	
Never	15	21	57	79	
Last time tested for HIV					15.40; <0.01
<3 Months ago	3	8	34	92	
In the past year	4	13	27	87	
>1 Year ago	5	12	37	88	
Never been tested	6	55	5	45	
People who are close to me accept me as a person who is LGBTQ					15.54; <0.001
Never/rarely	1	100	0	0	
Sometimes	4	50	4	50	
Often/always	12	11	99	89	
Missing	1	—	—	—	
I have friends who are like me and can understand what it is like to be LGBTQ					7.93; <0.05
Never/rarely	3	43	4	57	
Sometimes	4	27	11	73	
Often/always	10	10	88	90	
Missing	1	—	—	—	
Met new LGBTQ friends online or through a social networking site					14.93; <0.001
Never done this	7	47	8	53	
Yes, but not in the past 12 months	2	8	22	92	
Yes, in the past 12 months	8	10	73	90	
Missing	1	—	—	—	
Regularly discuss LGBT-related issues online or on a social networking site					NS
Yes	7	15	41	85	
No	10	14	62	86	
Missing	1	—	—	—	
SOGI disclosure to healthcare providers					NS
Not open/somewhat open	5	16	26	84	
Very open	9	12	69	88	
Missing	4	—	8	—	

LGBTQ, lesbian, gay, bisexual, transgender, queer; NS, not significant; PrEP, pre-exposure prophylaxis; SD, standard deviation; SOGI, sexual orientation and gender identity.

TABLE 3. CROSS-TABULATION FOR PERCEIVED EFFECTIVENESS OF PRE-EXPOSURE PROPHYLAXIS TO PREVENT HIV (N= 103)

Variable	Group				t-test; p
	PrEP is little effective or don't know		PrEP is pretty or very successful		
	n = 35 (34%)		n = 68 (66%)		
	Mean (SD)		Mean (SD)		
Age	35 (11)		35 (11)		NS
Age came out	17 (6)		18 (7)		NS
	n	%	n	%	Chi-square; p
Age group					NS
18–34	19	35	35	65	
35–49	12	32	25	68	
50+	4	40	6	60	
Race/ethnicity					NS
White	19	28	48	72	
Non White	16	44	20	56	
Sexual orientation identity					NS
Gay	29	32	63	68	
Bisexual	3	60	2	40	
Queer	3	50	3	50	
Education					NS
High school	5	50	5	50	
Some college	8	30	19	70	
College graduate	20	33	41	67	
Missing	2	—	3	—	
Region					NS
Northeast	9	60	6	40	
South	14	32	30	68	
Midwest	4	36	7	64	
West	8	24	25	76	
Ever had STI					NS
Once	7	39	11	61	
More than once	8	29	20	71	
Never	20	35	37	65	
Last time tested for HIV					10.70; <0.05
<3 Months ago	5	15	29	85	
In the past year	9	33	18	67	
>1 Year ago	19	51	18	49	
Never been tested	2	40	3	60	
People who are close to me accept me as a person who is LGBTQ					NS
Sometimes	2	50	2	50	
Often/always	33	33	66	67	
I have friends who are like me and can understand what it is like to be LGBTQ					NS
Never/rarely	3	75	1	25	
Sometimes	3	27	8	73	
Often/always	29	33	59	67	
Met new LGBTQ friends online or through a social networking site					NS
Never done this	2	25	6	75	
Yes, but not in the past 12 months	12	55	10	45	
Yes, in the past 12 months	21	29	52	71	
Regularly discuss LGBT-related issues online or on a social networking site					8.67; <0.01
Yes	7	17	34	83	
No	28	45	34	55	
SOGI disclosure to healthcare providers					3.85; <0.05
Not open/somewhat open	13	50	13	50	
Very open	18	26	51	74	
Missing	4	—	4	—	

from fear that their sexual identities and activities could be exposed as a result of stigma from their loved ones, including family members, friends, and partners.^{24–26} This parallels our findings regarding the strong relationship between deaf GBQ male respondents' level of PrEP knowledge and being accepted by close family and friends. Within this context, deaf GBQ men who are able to be open, maintain close relationships with loved ones, and be accepted by loved ones are more likely to be able to interact with their communities to gain stronger PrEP knowledge.

GBQ men who might not be able to be open and accepted are at risk for not being able to interact with their community and healthcare system. This may prevent the attainment of knowledge about PrEP and subsequently the understanding of PrEP's effectiveness to prevent HIV. Because many deaf people who use ASL experience significant challenges and often actively avoid interacting with the healthcare system,²⁷ deaf GBQ men who are unable to be open and accepted are at especially elevated risk for not being able to access information about PrEP. Our finding that deaf GBQ men's PrEP knowledge was associated with their adherence to HIV testing is consistent with the link between PrEP knowledge and HIV/STI testing adherence in MSM general populations.^{28–30}

Therefore, alternative resources outside the healthcare system and deaf GBQ men's community are important for sharing health information with this hard-to-reach population. This study found that meeting and making new LGBTQ friends online or through a social networking site enhanced deaf GBQ men's PrEP knowledge. In addition, actively engaging in discussions about LGBT-related issues online enhanced deaf GBQ men's perceptions regarding the effectiveness of PrEP to prevent HIV. As social media sites have added features that make it possible to record and upload video-based comments and responses, these features promote social exchanges between people who share the same language (spoken or signed). Moreover, social networking sites can be a useful source of health information sharing among deaf people, regardless of whether they perceived their health to be excellent or poor.³¹

As a result, we strongly recommend adding features that enable the use of ASL online, such as video-based comments and responses, to make social networking sites accessible and deaf-friendly so that deaf GBQ men, especially those who are unable to be open and accepted and those who might experience challenges with accessing the healthcare system, can engage in discussing and exchanging important information about efforts to improve HIV testing, accessing care, and early initiation of antiretroviral therapy. Future interventions or public health education programs about PrEP should consider including important health-related information in ASL and simplified English on social media sites as venues which are accessible to all deaf people, including deaf GBQ men.

Strengths and limitations

The strengths of this study include the wide-ranging demographics and the largest sample, to date, of deaf GBQ male individuals in a self-reported outcomes study that was fully accessible in ASL and English. Limitations of this study include the nature of study recruitment and face-to-face communication about the study procedure before taking the survey. Given that deaf GBQ men are an underrepresented and

underserved subpopulation, there were challenges related to recruitment. Even though the informed consent was available online in ASL and English, we required an additional step to meet with potential participants in person or through video-phone to briefly review the confidentiality and study procedures, as well as to answer any questions that they might have. This additional step might have created some discomfort and hindered potential deaf GBQ male participants from taking part (e.g., did not respond to follow-up e-mails to make an appointment). Unfortunately, responses to social media posts and flyers were low, but recruitment succeeded through relationship building methods, and this required additional time and effort compared to previous recruitment experiences with the general deaf population.

Conclusion

Alternative social resources outside of the healthcare system, especially social media resources outside of deaf GBQ men's family communities, provide an avenue to effectively share critical preventive health information with deaf GBQ men who are at risk for HIV infection—more specifically, those who are unable to be open and accepted within their communities and are unable to interact effectively with the healthcare system. Future intervention and public health education programs about PrEP should engage with social networking sites to provide online topic-focused discussion forums and include important preventive health-related information in ASL and simplified English to reach and communicate effectively with all deaf people, including deaf GBQ men.

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Authors' Contributions

P.K. designed the research and analyzed the data; A.B. recruited deaf GBQ men to participate in the study; P.K. and A.B. wrote the article; S.S. reviewed the article for intellectual content; and P.K. had primary responsibility for the final content. All authors read and approved the final article.

Disclaimer

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