



PrEP Use and Persistence Among Young Sexual Minority Men 17–24 Years Old During the COVID-19 Pandemic

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Abstract

The COVID-19 pandemic has caused disruptions to health care access for sexual and gender minorities in the U.S. We sought to explore the impact of COVID-19 on HIV pre-exposure prophylaxis (PrEP) use and sexual health services by assessing PrEP eligibility and use, changes in sexual behaviors, and HIV/STI testing during the COVID-19 pandemic. We surveyed 239 young sexual minority men (YSMM) 17–24 years old between April and September 2020 in the U.S. One-in-seven YSMM PrEP users discontinued use during the pandemic, and all those who discontinued PrEP reported a decrease in sexual activity. Twenty percent reported difficulty getting prescriptions and medications from their doctors or pharmacies, and more than 10% reported challenges accessing HIV/STI testing. Among those who met Centers for Disease Control and Prevention criteria for PrEP ($n = 104$), 86.5% were not currently using PrEP. Among those surveyed 3 months or later after the start of major COVID-19 stay-at-home measures ($n = 165$), 35.8% reported CAS with a causal partner within the past 3 months during the COVID-19 pandemic. Seeking HIV testing was associated with reporting condomless anal sex in the previous 3 months, indicating the necessity for ensuring continuity of basic sexual health services for YSMM. Failure to adequately adjust HIV prevention services and intervention in the face of pandemic-related adversity undermines efforts to end the HIV epidemic in the U.S.

Keywords Sexual minority men · Men who have sex with men · HIV · Pre-exposure prophylaxis · COVID-19

Resumen

La pandemia de COVID-19 ha causado interrupciones en el acceso a la atención médica para las minorías sexuales y de género en los EE. UU. Buscamos explorar el impacto de COVID-19 en el uso de la profilaxis de preexposición al VIH (PrEP) y los servicios de salud sexual mediante la evaluación de la elegibilidad y el uso de PrEP, los cambios en los comportamientos sexuales y las pruebas de VIH/ITS durante la pandemia de COVID-19. Encuestamos a 239 hombres jóvenes de

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minorías sexuales (YSMM) de 17 a 24 años entre abril y septiembre de 2020 en los EE. UU. Uno de cada siete usuarios de PrEP YSMM interrumpió su uso durante la pandemia, y todos los que interrumpieron la PrEP informaron una disminución en la actividad sexual. El veinte por ciento informó tener dificultades para obtener recetas y medicamentos de sus médicos o farmacias, y más del 10% informó tener dificultades para acceder a las pruebas de VIH/ITS. Entre los que cumplieron con los criterios de los Centros para el Control y la Prevención de Enfermedades para la PrEP ($n = 104$), el 86,5% no estaba usando PrEP actualmente. Entre los encuestados 3 meses o más después del inicio de las principales medidas de COVID-19 para quedarse en casa ($n = 165$), el 35,8% informó CAS con una pareja causal en los últimos 3 meses durante la pandemia de COVID-19. La búsqueda de la prueba del VIH se asoció con la notificación de sexo anal sin condón en los 3 meses anteriores, lo que indica la necesidad de garantizar la continuidad de los servicios básicos de salud sexual para YSMM. No ajustar adecuadamente los servicios de prevención del VIH y la intervención frente a la adversidad relacionada con la pandemia socava los esfuerzos para poner fin a la epidemia del VIH en los EE. UU.

Introduction

The COVID-19 pandemic continues to evolve rapidly in the U.S., with over 33 million confirmed cases and over 610,000 deaths as of July 2021 [1]. Public health efforts, including stay-at-home orders to combat the spread of COVID-19, have had unintended consequences on access to, and delivery of, health care services. Recent studies show that the pandemic has influenced the provision of sexual health services, including a significant reduction in the availability and accessibility of routine HIV and other sexually transmitted infection (STI) testing [2] and refills for antiretroviral medicines [3]. Similarly, the continuity of HIV pre-exposure prophylaxis (PrEP) care among priority populations might be disrupted because of clinic closures, reduced service availability, and accessibility issues.

Recent findings suggest that adolescents and young adults have been disproportionately affected by the COVID-19 pandemic and associated stay-at-home measures. Researchers have documented that the pandemic has already posed a threat to the social and emotional well-being of adolescents, and the pandemic was reported as the main stressor to this population [4]. In general, sexual minority men (SMM) and young sexual minority men (YSMM) face unique challenges accessing routine sexual health care due to individual and structural factors, such as low perceived risk of HIV and high levels of stigma and medical mistrust [5, 6]. There is a growing body of literature demonstrating that YSMM have lower rates of HIV testing and are less likely to adequately adhere to PrEP compared to older adult SMM because of enduring structural barriers including racism and discrimination, disinterest in regimen adherence, and confidentiality concerns [7, 8], especially among Black and Latino YSMM [9, 10]. The ongoing pandemic may highlight these disparities. Although 14–17 year old SMM reported fewer in-person interactions with sexual partners from March to early May 2020 of the pandemic [11], it is not clear whether decreases in in-person sexual activities persisted among older YSMM. In fact, a study conducted between April and May 2020 documented more sexual partners during the early

COVID-19 pandemic among a sample of SMM predominantly (i.e., > 80%) aged 24 and older [12]. Taken together, these studies suggest that SMM may have continued to engage in in-person sexual behaviors during the pandemic, and the disruption to routine HIV testing and PrEP services may increase YSMM's vulnerability to HIV and exacerbate disparities [13].

Researchers have illustrated that SMM using PrEP have discontinued or changed the frequency of PrEP dosing because of the impact of the pandemic on daily life [14]; however, little is known about this phenomenon among YSMM (17–24 years old) in the U.S. As such, the present study examined how COVID-19 and associated public health measures affected sexual behavior and PrEP use among a diverse, nationwide online sample of YSMM from mid-April to September 2020. Specifically, we assessed the status of PrEP eligibility among our sample and reported changes in PrEP use and discontinuation, sexual behavior, and access to sexual health services during the COVID-19 pandemic.

Methods

Study Procedures and Data Cleaning

Participants were recruited online from social media and men-for-men geosocial networking apps between March and September 2020 to participate in a brief (~5–10 min) screening survey as part of a recruitment campaign for the formative phase of a pilot randomized controlled trial, which was recruiting YSMM to participate in online focus groups about HIV self-testing and biomedical HIV prevention. Primary recruitment images featured two men, with young couples of various race/ethnicities across images designed to oversample Black and Latino YSMM. To be eligible for this analysis, participants were required to: (1) have answered the COVID-19 questionnaire added April 17, 2020, onward, (2) identify as a man (including transgender men), (3) be 17–24 years old; (4) self-report HIV-negative status; and (5) live in the U.S. The 17–24 age range was targeted in

our online advertising because of the parent study's goals around HIV self-testing among YSMM, which is currently approved for use among individuals 17 and older [15], and because SMM under age 25 account for the majority of HIV incidence in the U.S. [16]. Fraudulent responses were minimized by excluding any information on eligibility criteria from study advertisements and referral mechanisms, using the "prevent ballot box stuffing" feature in Qualtrics to prevent multiple responses, offering no incentive for completion of the screening survey, and using a delayed invitation procedure for the parent study to avoid attempts at determining the study's eligibility criteria [17]. To further ensure data integrity, duplicates were checked using a procedure of comparing contact information (i.e., name, email, phone number) and IP addresses. Due to the low-risk nature of the survey, the Institutional Review Board approved a modified consent process whereby participants read an informational letter and agreed to participate. A waiver of guardian permission was obtained for those considered minors. All study procedures were approved by the Institutional Review Board of the Medical College of Wisconsin.

Measures

Sociodemographic Characteristics

Participants were asked to report their age, gender identity, sexual orientation, race/ethnicity, and postal ZIP coded into U.S. census region. Participants were also identified by recruitment source.

Recent STIs and Sexual Behavior

Participants were asked questions related to recent bacterial STIs and sexual behaviors to determine whether individuals met Centers for Disease Control and Prevention (CDC) guideline criteria for PrEP use [18]. Specifically, we asked participants whether, in the past 6 months, they had: (1) a bacterial STI; (2) condomless anal sex (CAS) with a casual partner; (3) CAS with a main partner who is HIV-positive or unknown status; and/or (4) a main partner who had CAS with another person. We also evaluated CAS with a casual partner in the past 3 months, which allowed us to determine behavior fully encompassed during the time since the start of the major stay-at-home measures in the U.S. for a portion of the sample (i.e., those surveyed after June 13, 2020, 3 months after the declaration of national emergency [19]).

PrEP Use and Persistence During COVID-19 Pandemic

The ATN COVID Questionnaire [20] and newly created items were used to measure the impact of COVID-19

pandemic on PrEP use. Specifically, we asked respondents about current and prior PrEP use using the following question: "Have you ever been prescribed HIV medications (e.g., Truvada) for use as PrEP?" Response options included (1) *Yes, I am currently on PrEP*; (2) *Yes, but I am no longer taking PrEP*; and (3) *No, I've never taken PrEP* [21, 22]. Participants were also asked questions about changes in PrEP due to the COVID-19 pandemic. Current and former PrEP users were asked: "Have you had trouble (or did you have trouble) getting your PrEP prescription from your doctor/the pharmacy because of COVID-19 or the public health efforts to manage it?" Response options included (1) *No*; (2) *Yes*; and (3) *I haven't tried to get my prescription from my doctor/pharmacy*. Current and former PrEP users were also asked: "Have you changed (or did they change) your dosing method of PrEP because of COVID-19 or related public health efforts to manage it?" and "Did you ever stop taking PrEP because of COVID-19 or related public health efforts to manage it?" with *yes/no* response categories.

Changes to Sexual Behaviors and HIV/STI Testing During COVID-19 Pandemic

Participants were asked about changes to sexual activity using the Pandemic Stress Index [23]: "Which of the following are you experiencing (or did you experience) during COVID-19? (check all that apply)." If changes to sexual activity were selected, participants were asked: "Did you experience an increase or decrease in sexual activity during COVID-19? Response categories included (1) *increase* and (2) *decrease*. Additionally, participants were asked: "Have you had trouble (or did you have trouble) getting an HIV test because of COVID-19 or the public health efforts to manage it?" and "Have you had trouble (or did you have trouble) getting a STI test (like syphilis, gonorrhea or chlamydia) because of COVID-19 or the public health efforts to manage it?" Response options for both questions included (1) *No*; (2) *Yes*; and (3) *I haven't tried to get an HIV [STI] test since COVID-19 began* [20].

Data Analysis

Descriptive statistics were reported using frequency measures. Bivariate analyses were conducted using chi-squared comparisons and linear regression for categorical and continuous variables, respectively, to examine if sexual behavior and seeking HIV/STI testing were associated with any specific demographic characteristics. Significant ($p < 0.05$) results were tested using logistic regression to provide odds

ratios and 95% confidence intervals. Data were analyzed using R software.

Results

Participants Characteristics

Recruitment activities resulted in 1701 unique link clicks, resulting in 1164 participants agreeing to participate in the survey. Among those who agreed, 82% ($n = 953$) completed the survey and 830 participants completed the COVID-19 questionnaire added mid-April onward. Of those, 68 were ineligible by gender identity, another 497 were outside the target age range for this analysis, and 26 reported living with HIV. This resulted in a sample of 239 YSMM eligible for this analysis. Average age of respondents was 20.2 ($SD = 2.5$). Over half (54.0%) of men identified as gay, 12.6% identified as a transgender, and more than half were Black/African American ($n = 78$; 32.6%) or Latino/Hispanic ($n = 50$; 20.9%). See Table 1 for sample characteristics.

PrEP Eligibility, Use, and Persistence During COVID-19 Pandemic

Based on reported sexual behavior and prior bacterial STIs, 43.5% ($n = 104$) of the sample met CDC criteria for PrEP use. Specifically, 26 (10.9%) were diagnosed with a bacterial STI, and nine (3.8%) indicated that their main partner is HIV-positive or unknown status. A total of 99 (41.4%) reported CAS with a casual partner in the past 6 months, with 75.8% of those engaging in CAS with a casual partner in the past 3 months. In the past 6 months, 9 (3.8%) said they had CAS with their main partner living with HIV or of unknown HIV status, and 11 (4.1%) reported their main partner had CAS with another guy. Notably, among those who were PrEP eligible, more than 86.5% (90/104) were not currently using PrEP at the time of the survey. Additionally, among those surveyed 3 months after the start of major COVID-19 stay-at-home measures ($n = 165$), 59 (35.8%) reported CAS with a casual partner within the past 3 months.

In total ($n = 239$), 18 (7.5%) men were currently on PrEP and 17 (7.1%) had previously taken PrEP. Among those with current or prior PrEP use ($n = 35$), two (5.7%) reported changing dosing strategies and five (14.3%) stopped taking PrEP because of the COVID-19 pandemic. Meanwhile, 20.0% ($n = 7$) of current or former PrEP users reported having trouble getting a PrEP prescription from their doctor and 8.6% (3/35) expressed difficulty getting medication from their pharmacy; all individuals who

expressed difficulty getting medication from their pharmacy also had trouble getting a PrEP prescription from their doctor. Among men who discontinued PrEP, 100% ($n = 5$) indicated a decrease in sexual behavior, yet 60% still met CDC criteria for PrEP use based on past 6 months behavior. Nearly all men currently on PrEP indicated no change ($n = 8$, 44.4%) or a decrease in sexual behavior ($n = 9$, 50.0%); one PrEP user reported an increase in sexual behavior during the pandemic.

Sexual Activity and HIV/STI Testing During the COVID-19 Pandemic

About half (48.1%) of the sample reported no change in sexual activities as a result of the COVID-19 pandemic. However, 13.0% reported an increase in sexual behavior and 38.9% reported a decrease in behavior. There was no statistically significant difference in demographic characteristics when comparing YSMM who reported an increase in sexual behavior with those with no changes or a decrease. In terms of sexual health services, 11.7% indicated trouble getting an HIV test and nearly half (49.4%; $n = 118$) reported not trying to get tested for HIV since the pandemic began. Compared to those who did not try to get testing, men who sought HIV testing were more likely to report CAS with a casual partner ($OR 2.46$, 95% $CI 1.10$ – 5.51). Similar results were obtained for STI testing, as 10.5% experienced difficulty in getting tested and 50.2% ($n = 120$) had not attempted to get an STI test since the start of the pandemic.

Discussion

The results demonstrate non-uniform impacts of the COVID-19 pandemic on sexual behavior and access to HIV prevention among YSMM. Two groups of YSMM emerged: those who experienced declines in their sexual risk and the need for access to HIV prevention services, and those for whom sexual risk continued in an environment in which access to HIV prevention became limited. In terms of access to PrEP, our cross-sectional survey indicated that one in seven YSMM PrEP users stopped taking PrEP, and 20% of current or former PrEP users reported having trouble getting PrEP prescriptions from providers or the pharmacy during the middle part of 2020. Although the majority of PrEP users remained on PrEP despite the associated stay-at-home measures and reported reductions in sex, which is consistent with studies in Belgium and Australia [2, 14], it remains problematic that one-in-five PrEP users in the age group with the highest incidence of HIV infections struggled to access PrEP. These results add to our knowledge on the pandemic's impact on the PrEP care continuum and reveal that COVID-19 containment measures have the potential to disrupt both

Table 1 Demographic characteristics and HIV PrEP use among adolescent sexual minority men 17–24 years old ($n=239$)

Variables	<i>n</i>	%
Age (range: 17–24 years; $M=20.2$, $SD=2.5$)		
17	52	21.8
18	34	14.2
19	18	7.5
20	21	8.8
21	29	12.1
22	32	13.4
23	26	10.9
24	27	11.3
Gender identity		
Cisgender man	209	87.4
Transgender man	30	12.6
Sexual orientation		
Gay	129	54.0
Bisexual	65	27.2
Straight/heterosexual	32	13.4
Another	13	5.4
Race/ethnicity		
Black, non-Hispanic	78	32.6
Latino or Hispanic	50	20.9
White, non-Hispanic	78	32.6
Multiracial/another	33	13.8
U.S. region		
Northeast	42	17.6
Midwest	60	25.1
South	86	36.0
West	51	21.3
Recruitment source		
Social media	163	68.2
Men-for-men geosocial networking app	76	31.8
CDC PrEP guideline criteria		
PrEP eligible	104	43.6
Recent bacterial STI	26	10.9
Had CAS with a casual partner (past 6 months)	99	41.4
Had CAS with a casual partner (past 3 months)	75	31.3
Among participants surveyed April to mid-June ($n=74$)	16	21.6
Among participants surveyed mid-June to September ($n=165$)	59	35.8
Had CAS with main partner who is HIV positive or unknown status (past 6 months)	9	3.8
Whose main partner had CAS with another guy (past 6 months)	11	4.1
Persistence and changes to PrEP use during COVID-19		
Current PrEP use	18	7.5
Prior PrEP use	17	7.1
Changed PrEP dosing	2	5.7
Quit PrEP because of COVID-19 pandemic	5	14.3
Had trouble getting PrEP prescriptions from the doctor	7	20.0
Had trouble getting PrEP prescriptions at the pharmacy	3	8.6
Sexual behaviors and HIV/STI testing		
Changes in sexual activity	124	51.9
Increase in sexual activity	31	25.0
Decrease in sexual activity	93	75.0

Table 1 (continued)

Variables	<i>n</i>	%
Had trouble getting an HIV test	28	11.7
Had trouble getting an STI test	25	10.5
Haven't tried to get an HIV test since COVID-19 began	118	49.4
Haven't tried to get an STI test since COVID-19 began	120	50.2

Percentages may not add up to 100 due to rounding

CDC Centers for Disease Control and Prevention, *PrEP* HIV pre-exposure prophylaxis, *CAS* condomless anal sex, *STI* sexually transmitted infection

sexual behavior and PrEP use among YSMM, and that there remains a group of sexually active YSMM who continue to have prevention needs even when access to services is limited. Adoption of novel methods of health care delivery, such as the expansion of telehealth and HIV/STI self-testing, is needed to minimize the negative impact of the pandemic on HIV prevention services for YSMM—especially since the pandemic continued to worsen after completion of this study [1]. However, such interventions also need to consider the structural barriers that prevent PrEP use during a pandemic: for example, loss of employment limiting access to health insurance or the need for young people to move home to their parents, limiting privacy and the ability to utilize telehealth. Further research is warranted to understand how these structural barriers can be addressed by telehealth interventions. Previous studies have demonstrated that gender minority youth—many of whom resided with their parents—were willing to receive home HIV-testing kits [24], and the lessons learned from these studies can be applied to the needs of YSMM during the COVID-19 pandemic and any future public health emergencies.

We found that more than half of participants reported changes in sexual behavior since the start of the COVID-19 pandemic, with a majority reporting decreases in sexual activity. Reductions in in-person sexual activity is likely to result in decreased risk of HIV transmission for some YSMM, but our data indicate other YSMM are still engaging in sexual behavior, and the need for ongoing HIV prevention is evident. Notably, 13% of the respondents had an increase in sexual activities. As such, it is concerning that some participants reported challenges accessing HIV and STI testing services during the COVID-19 pandemic. Additionally, most of the YSMM who discontinued PrEP during the pandemic still met CDC criteria for PrEP use, indicating that efforts to help men make decisions to stay on or discontinue PrEP are needed, with particular emphasis on current and anticipated sexual behavior rather than prior reported behavior. Public health messaging would benefit from combined HIV and COVID-19 harm reduction messaging given the coupled urgency of the pandemic with the ongoing need for HIV prevention in the U.S.

These results are aligned with other research noting reductions in sexual behavior among YSMM during the COVID-19 pandemic. Notably, Nelson et al. observed a decrease in in-person sexual activity, which was offset with an increase in virtual sexual behaviors via text messages, video chats, and geosocial networking applications among adolescent SMM [11]. The current study does not provide information on virtual sexual behaviors but does show decreases in in-person sexual activity in a national sample of YSMM. It is possible that some YSMM may be seeking more virtual rather than in person sexual encounters (e.g., sharing explicit photos and videos, viewing condomless sex pornography) to offset the impact of social isolation and lack of social support. Although these findings suggest that most YSMM adapted and took precautions to prevent COVID-19, these temporary decreases in in-person sexual activities may result in an increased vulnerability to HIV and other STIs in the future when physical sex is resumed [25]. These temporary decreases in sexual behavior for some YSMM offer a unique opportunity to help YSMM re-engage with healthy sexual behaviors and prevention services once they feel more comfortable that COVID-19 risk has decreased and are ready to have sex again. Research is needed to monitor longitudinal trends in sexual behavior during and after the pandemic to assess long-term consequences of COVID-19 containment measures on the sexual health of YSMM. Comparisons between the experiences of YSMM and older SMM, as well as time series analyses before, during, and after the pandemic, are valuable areas for future research.

Limitations

This analysis has several limitations. First, we collected data using online-only strategies as an ethical way to minimize the risk of COVID-19 among our participants; as such, generalizability of our findings should be limited to YSMM using social media and networking apps. Second, all data were self-reported, which could result in social desirability bias. Third, participants were not required to have recent sex to be eligible to participate in the survey; 19.2% of the sample reported no main or casual sex partners in the past 6 months. Thus, some participants

may have reported no change in sexual behavior due to the COVID-19 pandemic because they were not sexually active pre-pandemic. Fourth, our questionnaire was rather brief (to facilitate keeping the screening survey short for the parent study), diminishing our ability to provide a more nuanced interpretation of the data. However, a notable strength of our research was the parental waiver of consent, allowing us to adequately sample YSMM including those who may not be out to their parents or guardians, during an unprecedented time during the COVID-19 pandemic.

Conclusion

This study provides a brief description of PrEP use during the COVID-19 pandemic, as well as changes in sexual behavior, in a convenience sample of YSMM recruited online. Our findings underscore the need to ensure continuity of basic sexual health services for a population vulnerable to HIV and the need to adapt PrEP modalities and telehealth services to increase immediate and long-term accessibility. Failure to adequately adjust HIV prevention services and intervention in the face of pandemic-related adversity is antithetical to our ongoing challenge to end the HIV epidemic in the U.S.

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Author Contributions SAJ was responsible for overseeing all aspects of the study as Principal Investigator, including study and manuscript conceptualization, measures development, participant recruitment, data management, and day-to-day operations. CH was responsible for literature search, and CH and SAJ were responsible for data analysis and manuscript writing. KJH, RS, KMN, AEP, and JLW provided feedback on data analysis, analysis interpretation, and manuscript revisions. All authors provided intellectual content to the paper and reviewed and approved the final manuscript.

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Data Availability Data is available upon request to the Administrative Core of the Center for AIDS Intervention Research. Individuals who meet criteria for access to de-identified data should contact the

Principal Investigator (sjohn@mcw.edu) or Karen Opgenorth (kopgnort@mcw.edu) to facilitate data transfer.

Code Availability Not applicable.

Declarations

Conflict of interest AEP receives research funding from Gilead Sciences, Inc. All other authors declare that they have no conflict of interest.

Ethical Approval All study procedures were approved by the Institutional Review Board of the Medical College of Wisconsin. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent This study met the Medical College of Wisconsin Institutional Review Board's definition of "minimal risk" and a waiver of informed consent was granted. All participants agreed to participate after reviewing the study's informational letter. A waiver of guardian permission was obtained for those considered minors.

Consent for Publication Not applicable.

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