



Factors associated with new sexual partnerships during the COVID-19 pandemic: a survey of on-line sexually transmitted infection testing platform users

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Abstract

Background: The COVID-19 pandemic has coincided with an explosion of on-line platforms for sexually transmitted infections (STIs) testing using self-collected, mail-in specimens. Reports on the effect of COVID-19-associated restrictions on sexual behaviors have been mixed, but STI transmissions have continued during the pandemic. We sought to understand the pandemic impact on sexual habits associated with STIs among IWantTheKit (IWTK) users.

Methods: Users of IWTK, a free, on-line STI testing platform, were invited to complete an anonymous questionnaire. Descriptive statistics were used to describe survey responses. Associations with reports of new sex partnerships were explored as a marker of STI risk. Descriptive statistics, univariate and multivariate logistic regression models were used to analyze individual characteristics and reported behaviors associated with self-reported new sexual partnerships during the first two COVID-19 pandemic waves.

Results: Of the 3,462 users of the on-line STI testing platform between June 2020 and February 2021, 1,088 (31.4%) completed the on-line survey; 705 (66.2%) of 1,065 reported a new sex partner. One-quarter met their sex partners using Apps. Overall, 10% were symptomatic and almost 18% were concerned that their partner had an STI. White race in males (OR 1.81 [95% CI:1.04, 3.16]), female age <25 years (OR 1.85 [95% CI:1.09, 3.14]), and increased condom use in both men and women were significantly associated with reports of new sexual partnerships in adjusted analysis.

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Conclusions: Despite pandemic restrictions on social gatherings, new sexual partnerships were common in this population, associated with common risk factors, and may help to explain ongoing STI transmission.

Short summary

In an online survey of mail-in self-collection STI test users during COVID-19, 66.2% of respondents reported a new sex partner. White race in males, female age <25 years, and increased condom usage were significantly associated with reporting a new sex partner.

Keywords

Sexually transmitted infections; COVID-19; pandemic; sexual partnerships; survey

Introduction

The Centers for Disease Control and Prevention (CDC) 2020 data revealed that two of the three most common notifiable sexually transmitted infections (STIs), gonorrhea, and syphilis, were at an all-time high with increased case numbers of 45%, and 52%, respectively, compared to 2016[1]. The coronavirus disease 2019 (COVID-19) pandemic, caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), significantly disrupted access to medical services, including STI testing. This reduction in service reduced opportunities for laboratory testing and diagnosis, and collection of epidemiological data likely resulting in an underestimate of the true burden of STIs in 2020[2].

In response to the reduction of in-clinic STI testing services, caused by the COVID-19 pandemic, the availability and use of on-line, mail-in, self-collection services and HIV self-test provision greatly expanded, especially during the early stages of the pandemic[3–6]. On-line testing services attract a diverse population of individuals, including priority populations: men who sex with men (MSM) and people of color[7], in part due to perceived benefits such as increased convenience. During the pandemic, the free, online mail-in self-collection STI testing service, IWantTheKit (IWTK), experienced a significant increase in the number of users. During the first pandemic wave, those who traditionally sought STI testing services and treatment at sexual health clinics in Baltimore City were referred to the service due to clinic closures[8].

Despite the increased popularity of online testing services, there are limited data on the sexual behaviors, including new partnerships, of individuals seeking STI testing. In an Australian online survey, 53% of respondents, reported decreases in sexual activity during COVID-19 lockdown in 2020, compared to 2019; this included a decrease in casual sex partners[5]. A study of MSM in Baltimore demonstrated decreases in STI risk behaviors, but minimal change in STI positivity during compared with before the pandemic[9]. Other studies, including surveys of MSM, found no changes in sexual behaviors during the pandemic[10, 11]. Data are limited on the impact of sexual behaviors associated with increased risk for STI transmission during pandemic conditions.

Using an anonymous on-line survey, we sought to understand the impact of the COVID-19 pandemic on sexual behaviors associated with STI/HIV transmission and acquisition, such as condom use and new sexual partnerships, from a sample of individuals requesting online STI/HIV testing services.

Materials and Methods

IWTK was established in 2004 as an on-line platform to provide free, home-based specimen self-collection and mail-in for STI testing in a reference lab[12]. To explore changes in sexual behavior of on-line STI test users during pandemic conditions, we conducted an on-line survey. An external link to the survey was provided on the IWTK website in June 2020, during the first wave of COVID-19, and was available to residents of Maryland, and Washington DC (served by IWTK in 2020); it was extended to Alaska residents in September 2020. The Johns Hopkins School of Medicine Institutional Review Board (IRB00248714) and the Alaska Area Institutional Review Board (2020–07-030–2) provided ethical approval.

The survey was anonymous, independent of kit return or STI result, and data collected were deidentified and unlinked to the individual respondent. Each time a user logged onto IWTK to order an STI test kit, they were offered the opportunity to participate in the survey after completing their orders; the survey was optional, and an on-line consent statement was available for all participants. Multiple responses were possible to some questions, and any question could be omitted per respondent's preference, hence the denominator could be different from the total number of individual respondents. Data on sexual orientation was collected in the survey, but not by IWTK so comparisons were not possible between those who completed the survey and those who did not. The survey captured data in different domains that are key to understanding sexual health and wellbeing, including demographic, gender, sexual orientation, condom use, and other behavioral data.

Statistical analyses

Descriptive statistics were generated using mean and standard deviations (SD), median and inter-quartile range (IQR) for continuous measures, counts and percentage for categorical measures in both the survey population and all IWTK users in the same time period. Difference of distribution between the two populations as well as between demographic groups were tested using Student's t-test if comparing continuous variables, and Fisher's exact test if comparing categorical variables. Univariate and multivariate logistic regression models were used to examine the association between the primary outcome response (i.e. 'Have you had any new sexual partner since COVID-19 shut down (March 16, 2020)?') and factors of interest. Variables that were significant at 0.05 level from the univariate regression, e.g., sex, race, sexual orientation, and age categories were included in the multivariate regression. Odds ratio (OR) with 95% confidence intervals (CIs) were estimated.

For the purposes of this analysis, COVID-19 waves[13] were defined as a rising number of COVID-19 cases with an identifiable peak, followed by a decline[14]. For these analyses the first wave was defined as March-June 2020, and the second wave November 2020-February 2021. The timeframes chosen mapped closely to other measures of reduced access to sexual

health services such as national chlamydia and gonorrhea screening data where in early April 2020 there was an overall decrease in testing by 59% for females and 63% for males compared to baseline[2]. Other temporal trends, such as periods of reduced reporting of bacterial STIs to the CDC, between March – June 2020, and increased diagnoses of syphilis and gonorrhea in November and December 2020[15] closely aligned with the timeframes used in these analyses. We hypothesized that there might be less new sex partner meeting during the second wave of COVID-19, when restrictions to movements were greatest, compared to earlier in 2020 when restrictions had been somewhat relaxed. To explore the effect of time, we undertook a sensitivity analysis to determine if there were differences by time periods corresponding to different COVID-19 waves. All statistical analyses were performed using Stata I/C 15 (StataCorp. 2017. Stata Statistical Software: Release 15. College Station, TX).

Results

Survey population

Between June 10th, 2020 and February 2nd, 2021, there were 3,462 individual STI testing kit orders through IWTK; of those, 1,088 (31.4%) users responded to the survey. Of these, 637 (58.6%) of survey participants were residents in Baltimore City, 326 (30.0%) were Maryland residents outside of Baltimore City, 50 (4.6%) were Alaska residents, and 48 (2.5%) resided in Washington DC; 27 (2.5%) did not provide a residence response. Of those answering the questions, 69.1% (739/1,069) reported that they had not tried to access STI testing other than through IWTK during the pandemic and 67.8% (908/1,115) reported that they would inform ‘all’ of their sex partners of any positive STI results. Overall, 17.0% (180/1,060) reported no condom use during the pandemic, 15.2% (229/1,502) sought testing because they were concerned that a partner had an STI, and 14.4% (217/1,502) were symptomatic.

Table 1 describes the characteristics of survey responders and all IWTK users during the same time period. Proportionally, more White-identifying individuals responded to the survey than overall White-identifying IWTK users (30.6% vs 21.1%). Less African American/Black-identifying respondents completed the survey than overall African American/Black-identifying IWTK users (53.6% vs 63.0% respectively). The survey respondents were broadly representative of all IWTK users with respect to age and gender identity.

New sex partnerships during the COVID-19 pandemic

Of the 1,088 survey respondents, 23 (2.1%) did not answer the question about a new sex partner and were excluded from this analysis. Of 1,065 respondents, the majority (66.2%) reported having a new sex partner during the COVID-19 pandemic. Of respondents reporting a new sex partner who answered the question 271/1,073 (25.3%) met their partners using dating Apps (data not shown). Table 2 shows the demographic characteristics of the population stratified by self-reports of new sex partner(s).

Factors associated with new sex partnerships

In the univariate analyses (data not shown), reporting a new partner was significantly associated with being male, White (compared to African American/Black), aged <25 years (compared to 35 years), being Gay/Lesbian/MSM, ordering an STI test because of concern that a partner may have an STI, and using condoms (compared with pre-pandemic) the same amount or greater. Table 3 describes adjusted ORs of factors associated with having a new sex partner. In the multivariate analyses those most likely to report a new sex partner(s) during the pandemic were White males compared to African American/Black, females aged <25 years (compared to 35 years), and with increased condom use in both females and males. In males, pandemic-related sexual anxiety was associated with having a new partner during the pandemic.

Survey responses during different waves of COVID-19

By the completion of the survey (February 2021), the US had experienced two distinct waves of COVID-19. The first, occurred in March-June 2020, the second in November 2020 – February 2021[14]. We undertook a sensitivity analysis on survey responses to determine if there were differences by wave and found no significant differences in new sex partner meeting during the two wave periods (data not shown).

Discussion

In our online survey of on-line STI test users with over 1,000 respondents, the majority reported a new sex partner during the first year of the pandemic which was considered a proxy for increased STI risk[1, 16, 17]. Early in the pandemic there was widespread speculation about the effects of COVID-19 on sexual behaviors[18]. These data supported both increased isolation and fewer sex partners, and increased sexual activity during-compared with pre-pandemic. The mechanisms underlying these differences have not been elucidated but could include those mediated by boredom and stress[19], pandemic ‘fatigue’, and prolonged restrictions, disrupting relationship norms resulting in higher risk sex[20, 21]. However, empirical evidence to support or refute such speculation is limited. There was no evidence of significant differences in reported new sex partnerships during different pandemic waves, including periods of more- and less - stringent social distancing mandates[14], suggesting that more social distancing requirements may not have changed new sex partner seeking behaviors.

Other surveys and studies have provided additional context to sexual behavior during the pandemic. In an online survey of US MSM during COVID-19, the majority of the 518 respondents did not consider it important to reduce the number of sex partners[11]. Between February and May 2020, 202 (39%) of participants reported a mean increase of 2.3 sex partners, a mean increase of 2.1 anal sex partners, but a very small increase in partners with whom they reported unprotected anal sex[11]. In a Spanish study of 536 respondents to an online survey, the mean number of sexual activities per week was 2.39 (1.80); 72% of respondents reporting sexual activity were female. Data were not presented on behaviors associated with higher risk of STI such as condom use or sex with a new partner[22]. Importantly, respondents to our survey were actively seeking out STI testing and, therefore,

were *a priori* at potential greater risk of STI. This is supported by the finding that people continued to have sex with partners in whom they suspected STIs. Previous IWTK data demonstrated a positive association between STI positivity and higher self-reported sexual risk scores in women[23] and men[24].

Respondents who identified as male and White, or who were females aged <25 years were significantly more likely to report a new sex partner; published data collected during a similar timeframe corroborate our data showing increased sexual activity in respondents who were younger, and male [25]. CDC STI data consistently demonstrate that people aged <25 years have the highest rates of bacterial STI[1]. Reassuringly, reported condom use did not decrease over the study period; this finding may reflect behavioral compensation in the context of new relationships and suggests that respondents did not represent a homogenous population of individuals with increased vulnerability. There were a substantial proportion who had symptoms or who were concerned that they may have been exposed to an STI which may explain accessing IWTK during a time when STI testing and treatment services were curtailed.

Conversely, other study findings are at odds with ours, including studies reporting that behaviors shifted towards monogamy during COVID-19 with fewer reports of partners outside of primary relationships[26]. None of the published studies examine sexual habits and new sexual relationship status, and were general population surveys or primarily in sexual minority men.

CDC data consistently show African American/Black persons shouldering a disproportionate burden of STI in the US[1]; our study demonstrated that, after controlling for other factors, White men were more likely to report new sex partners. The observed differences between the survey findings and CDC data may be explained by unmeasured factors. For example, White men may have a greater number of new sexual partners than other men but this risk may be mitigated by behavioral compensation such as increased condom use, or by better access to clinical services.

One-third of men who completed the survey identified as MSM. Pre-pandemic data demonstrates that sexual minority men had higher numbers of new sex partners than their heterosexual counterparts[17]. Other studies of majority White MSM in early COVID-19 showed half had fewer sex partners during- compared to pre-pandemic[10]. None of the other studies described were in predominately African American/Black persons with almost equal spilt between men and women. Observed differences between other studies and ours may, in part, have been mediated by differences in race and sex. While we cannot directly compare findings because of different enrolment criteria, time lines, information on partner status, and populations surveyed, our data demonstrated that after controlling for other factors, sexual orientation was not associated with reports of new sexual partnerships during the pandemic.

The strengths of this study include a large sample size (>1000), from people ordering an on-line STI test kit, which suggests that users at least had a perception of increased risk of STI, including almost 30% who were either symptomatic or concerned that they

were being exposed to an STI. The findings of the current analysis add to other studies where STI testing behaviors were not assessed. The survey ran for 8 months and covered two COVID-19 waves in the US. Approximately a third of male-identified respondents were MSM. The proportion of African American/Black persons who completed the survey was greater than 50%. The anonymous nature of the survey should have reduced social desirability bias.

The study also had limitations. The lack of a comparison group, other than the internal contrast between those who did and did not report a new sex partner, prevents correlation with other populations. The cross-sectional design, prevents analyses of change in individual responses over time or to behavior prior to the pandemic. The same anonymity that may have encouraged disclosure of sexual behaviors precluded measurement of sexual risk scores, the proportion of respondents who returned their kits, nor allowed assessment of associations between reported behavior and IWTK STI positivity. It is possible that the same individual took the survey more than once if they ordered STI testing multiple times during the survey period. Respondents were people ordering STI tests on-line, introducing ascertainment bias; response and non-response bias are suggested by the observation that proportionately less people of color answered the survey than who used the IWTK platform during the pandemic. These and other, unmeasured biases limit the generalizability of these data. Nonetheless, they do reveal that the majority of survey respondents did have a new sexual partner during the pandemic. It is noteworthy that the survey was conducted before the widespread use of COVID-19 vaccination, after which behaviors may have changed.

Conclusion

Social distancing mandates were not observed as demonstrated by reports of sexual activity with new sex partner(s) especially in younger women, and those identifying as White men and may explain on-going STI transmission. As STI/HIV on-line testing platform offerings increase, they should be leveraged to highlight the benefits and availability of STI/HIV prevention. On-line testing platforms should capitalize on their visibility to priority populations, historically underserved by healthcare institutions, to ensure equity of access to sex-positive safer sex messaging.

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Table 1.

Characteristics of survey respondents compared with all IWTK users between June 2020 and February 2021

	Survey responders	All IWTK users
n	1088	3462
Age (median [IQR])	27 [23, 34]	27 [23, 33]
Age (mean (SD))	29.75 (9.50)	29.29 (8.86)
Age categories (%)		
17 and younger	0 (0.0)	52 (1.5)
18–24	358 (32.9)	1111 (32.1)
25–34	445 (40.9)	1564 (45.2)
35–44	163 (15.0)	508 (14.7)
45–54	58 (5.3)	151 (4.4)
55 and older	29 (2.7)	76 (2.2)
Race (%)		
White	333 (30.6)	731 (21.1)
African American/Black	583 (53.6)	2180 (63.0)
Others	172 (15.8)	551 (15.9)
Gender identity (%)		
Male/Man	500 (46.0)	1687 (48.7)
Female/Woman	545 (50.1)	1706 (49.3)
Trans Man	5 (0.5)	9 (0.3)
Trans Woman	4 (0.4)	7 (0.2)
Genderqueer	23 (2.1)	49 (1.4)
Different Identity	2 (0.2)	4 (0.1)

IWTK IWantTheKit; IQR interquartile range; SD standard deviation; % percent

Table 2.

Differences by new sex partner(s) report during the COVID-19 pandemic between June 2020 and February 2021

N (%)	Overall 1065 (100)	No new sex partner 360 (33.8)	New sex partner 705 (66.2)	P-value*
Age (median [IQR])	27 [23, 34]	28 [23, 35]	27 [23, 33]	0.062
Age categories (%)				0.283
18–24	354 (33.2)	108 (30.0)	246 (34.9)	
25–34	434 (40.8)	145 (40.3)	289 (41.0)	
35–44	161 (15.1)	61 (16.9)	100 (14.2)	
45–54	58 (5.4)	26 (7.2)	32 (4.5)	
55 and older	28 (2.6)	9 (2.5)	19 (2.7)	
Missing	30 (2.8)	11 (3.1)	19 (2.7)	
Race (%)				<0.001
White	329 (30.9)	82 (22.8)	247 (35.0)	
African American/Black	574 (53.9)	220 (61.1)	354 (50.2)	
Others	162 (15.2)	58 (16.1)	104 (14.8)	
Gender identity (%)				0.001
Male/Man	494 (46.4)	138 (38.3)	356 (50.5)	
Female/Woman	534 (50.1)	211 (58.6)	323 (45.8)	
Trans Man	5 (0.5)	0 (0.0)	5 (0.7)	
Trans Woman	4 (0.4)	0 (0.0)	4 (0.6)	
Genderqueer	23 (2.2)	8 (2.2)	15 (2.1)	
Different Identity	2 (0.2)	2 (0.6)	0 (0.0)	
Missing	3 (0.3)	1 (0.3)	2 (0.3)	
Sexual Orientation (%)				<0.001
Heterosexual	622 (58.4)	237 (65.8)	385 (54.6)	
Gay/Lesbian/MSM	180 (16.9)	35 (9.7)	145 (20.6)	
Bisexual	196 (18.4)	64 (17.8)	132 (18.7)	
Other	46 (4.3)	11 (3.1)	35 (5.0)	
Missing	21 (2.0)	13 (3.6)	8 (1.1)	
Reason for STI test order (%)				0.001
Symptomatic	107 (10.0)	44 (12.2)	63 (8.9)	
Concern that partner might have an STI	191 (17.9)	56 (15.6)	135 (19.1)	
HIV check/PrEP	723 (67.9)	234 (65.0)	489 (69.4)	
Missing	44 (4.1)	26 (7.2)	18 (2.6)	
Sex with a partner(s) that respondent thought might have an STI (%)				0.021
No	609 (57.2)	227 (63.1)	382 (54.2)	
Yes	219 (20.6)	63 (17.5)	156 (22.1)	
Missing	237 (22.3)	70 (19.4)	167 (23.7)	
Condom use since the pandemic (%)				<0.001
No use/less often	299 (28.1)	132 (36.7)	167 (23.7)	

	Overall	No new sex partner	New sex partner	P-value*
N (%)	1065 (100)	360 (33.8)	705 (66.2)	
More often	212 (19.9)	46 (12.8)	166 (23.5)	
The same amount	459 (43.1)	113 (31.4)	346 (49.1)	
Other	95 (8.9)	69 (19.2)	26 (3.7)	

* P-value calculated by Fisher's exact test, % percent; IQR interquartile range

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Table 3.

Factors associated with reporting new sexual partner(s) during the COVID-19 pandemic between June 2020 and February 2021

	Male			Female				
	OR	CI	P-value	OR	CI	P-value		
Race (Ref: African American/Black)								
White	1.81	1.04	3.16	0.037	1.33	0.84	2.11	0.224
Other	0.84	0.46	1.54	0.570	0.86	0.50	1.50	0.601
Age categories (Ref: 35 y/o)								
<25 y/o	1.49	0.83	2.67	0.186	1.85	1.09	3.14	0.023
25–34 y/o	0.99	0.59	1.66	0.973	1.64	0.97	2.76	0.063
Male : Sexual orientation (Ref: Heterosexual)								
Gay/MSM	1.54	0.90	2.63	0.115				
Bisexual/Other	0.89	0.47	1.68	0.716				
Female *: Sexual orientation (Ref: Heterosexual)								
Non-heterosexual					1.04	0.67	1.62	0.856
Why order (Ref: symptomatic)								
Thought partner had STI	1.61	0.74	3.50	0.226	1.76	0.82	3.76	0.146
To obtain an HIV test	1.51	0.79	2.88	0.216	1.27	0.66	2.41	0.473
Condom use (Ref: No use/less often)								
More often	2.26	1.21	4.21	0.010	3.02	1.66	5.47	<0.001
Same amount	1.55	0.93	2.59	0.096	2.66	1.71	4.15	<0.001
Other	0.16	0.07	0.37	<0.001	0.31	0.14	0.67	0.003
COVID-19 effect on sex behavior vs. No effect	1.69	1.08	2.65	0.023	1.38	0.91	2.08	0.126

Ref reference group; = equal or greater than; y/o year old; < less than; vs. versus

* The numbers in the female bisexual or other categories were too small for separate analysis. They were combined into a non-heterosexual category consisting of Gay/Lesbian/Bisexual/Other