COVID-19 Testing Results by HIV Status, March–July 2020, Chicago, USA

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The role of HIV in coronavirus disease 2019 acquisition is not yet understood. Among 1862 patients, including 349 people with HIV—with most of these being virally suppressed and 308 having recently used pre-exposure prophylaxis—we compared rates of positive polymerase chain reaction results. Positivity was higher among people with HIV (10.6%) compared with HIV-negative patients (7.1%) but was not significant in adjusted models.

Keywords. HIV; COVID-19; PrEP; race.

As severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is still a novel pathogen, many questions remain unanswered. While some comorbidities and risk factors have been identified, little is known regarding how HIV status affects coronavirus disease 2019 (COVID-19) acquisition. Outcomes among cohorts of people with HIV (PWH) in New York, Italy, Spain, China, and South Africa have been been reported [1–6]; these studies have generally but not always found no increase in adverse outcomes among PWH. Recent work in the United States has found that social and environmental risks as well as other comorbidities were frequent among COVID-19-positive PWH [7]. This project aims to understand whether HIV increases the risk of being polymerase chain reaction (PCR) positive for COVID-19 using a retrospective cohort.

METHODS

Starting March 13, 2020, Howard Brown Health (HBH), a federally qualified health center focusing on sexual and gender minority care, began using clinic sites, mobile health units, and community testing sites to expand access and increase COVID-19 testing in the highest-risk communities in Chicago, regardless of sexual orientation or gender. Community partnerships with Project VIDA and Taskforce were strategically used to improve testing in populations outside the existing patient pool. Testing visits involving nasopharyngeal tests were performed by providers and were sent to a local lab; results were available within 3–10 days.

Data were abstracted from the electronic medical record of all testing sites from March 13 to July 22, 2020. All patients in this analysis had at least 1 HBH visit before their first COVID PCR test. Descriptive statistics are presented on all clients screened using reverse transcription PCR during this period, with additional data from patients’ prior electronic medical records. Any tests after a patient’s first positive test result were excluded, as were indeterminate and pending results. We present 95% CI for positivity rates for readers to assess the precision of the estimates; however, criteria for testing changed over time, and the rates were not adjusted for temporal trends. We then used generalized estimating equation models (to account for repeated observations) with a logit link to model the odds of having a positive test result; patients aged 10–19 were excluded from the models due to small sample size. Weeks 22 and 25 were also excluded, as there were no or few tests during those weeks due to protests in the city (Figure 1). The model was first adjusted only for testing week and then for all variables (age, race, gender, orientation, insurance, and HIV status) including testing week.

All analyses were conducted in SAS 4.0, and the University of Chicago Institutional Review Board (IRB) approved this study and waived consent.

RESULTS AND DISCUSSION

Overall, 1862 HBH patients received 2010 test results during the analysis period. Patients were primarily 20–39 years old (65%) and White (45%), with 25% identifying as Black and 22% as Latinx. Most identified as cismen (62%) and half as gay. The sample was mostly representative of the general HBH patient population (defined as those with a visit between October 2019 and February 2020); however, among patients, a higher proportion of English-speaking, genderqueer, gay, privately insured, Chicago-based, and PWH were tested, while those who identified as straight and from other parts of Illinois were less likely to be tested. There were 349 PWH, 292 of whom were virally suppressed, and 308 had recently (in the past 3 months) used pre-exposure prophylaxis (PrEP); PrEP use was determined using prescription records.

Of 2010 tests, there were 155 positive test results, for a positivity of 7.7% (95% CI, 6.6%–9.0%) (Table 1). Positivity rates were higher among Black (9.1%; 95% CI, 4.0%–17.1%)
Among PWH (n = 1661, 10.6%; 95% CI, 7.6%–14.3%) compared with HIV-negative individuals (n = 349, 7.1%; 95% CI, 4.5%–10.1%). Positivity was higher among those whose preferred language was Spanish (n = 51, 27.5%; 95% CI, 15.9%–41.7%). Positivity was also higher among those who were virally suppressed (n = 316, 11.3%; 95% CI, 7.9%–15.5%) compared with those who were not suppressed (n = 21, 9.5%; 95% CI, 1.2%–30.4%), although the confidence interval among those not suppressed was very wide due to the small sample size. Among HIV-negative patients, positivity was somewhat higher among those with recent or past PrEP use compared with never users (Table 1). When limited to only MSM (as a rough marker of PrEP eligibility), recent PrEP use was still associated with higher positivity (adjusted odds ratio [aOR], 2.29; 95% CI, 1.21–4.69; adjusted for week), while past PrEP use was not (aOR, 0.96; 95% CI, 0.40–2.29).

After adjusting for week of testing and repeated observations, patients aged ≥60 had lower odds of a positive test compared with those aged 20–38 years. Patients identifying as Latinx, Asian, or Black all had increased odds of a positive test compared with White patients; only the association for Black patients remained statistically significant in the fully adjusted model. Bisexual and queer patients had lower odds of a positive test compared with gay patients; only the association for queer identity remained significant in the full model. While gender was not significant in the full model, transmen had the lowest odds of a positive result (compared with cismen), and transwomen were the only group with increased odds. Insurance and HIV status were not significantly associated with positive results. Data for viral suppression and PrEP use were too sparse to adjust for week of testing or any other confounders.

CONCLUSIONS

Among patients at a large urban FQHC, we found no significant association between HIV status and SARS-CoV-2-positive PCR results in the first 5 months of the pandemic. We did find that recent PrEP users did have a high positivity compared with nonusers, though we were not able to adjust for confounding; another study found a similar result, which warrants further investigation [9]. Similar to other research, we found increased odds of positive results among Latinx, Asian, and Black patients and lower odds among older patients.

In line with our results regarding HIV status, a recent review of the literature, while limited, also suggests that comorbidities and social determinants of health play a larger role in COVID-19 acquisition and severity than HIV status in the United States and Europe, while contradictory results have been found in South Africa [6, 10]. One possible explanation regarding PrEP is that PrEP users are engaging in more social interactions and therefore are have more exposures. Larger sample sizes are needed to address questions regarding viral suppression and PrEP use with COVID-19 acquisition, while sufficiently addressing confounding.

Our results regarding racial and ethnic minorities are consistent with the hypothesis that minority patients are often in economic situations, such as essential work with minimal personal protective equipment or reduced financial ability to isolate or work from home, that put them at increased risk for COVID-19 acquisition and severity than HIV status in the United States and Europe, while contradictory results have been found in South Africa [6, 10]. One possible explanation regarding PrEP is that PrEP users are engaging in more social interactions and therefore are have more exposures. Larger sample sizes are needed to address questions regarding viral suppression and PrEP use with COVID-19 acquisition, while sufficiently addressing confounding.

CONCLUSIONS

In conclusion, we found no evidence that COVID-19 infection was associated with HIV status. Our work supports the importance of structural and systemic inequalities as drivers
putting Black and Latinx patients at higher risk [11]. More work is needed to understand the intersecting risks among sexual and gender minorities.

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Patient consent. This study was deemed exempt by the University of Chicago and Howard Brown Health IRBs. This study did not require written consent from participants.

References

1. Gervasoni C, Meraviglia P, Riva A, et al. Clinical features and outcomes of HIV patients with coronavirus disease 2019. Clin Infect Dis 2020; 71:2276–2278.
2. Vizcarra P, Pérez-Elias MJ, Quereda C, et al. Description of COVID-19 in HIV-infected individuals: a single-centre, prospective cohort. Lancet HIV 2020; 7:e554–64.
3. Hu Y, Ma J, Huang H, Vermund SH. Coinfection With HIV and SARS-CoV-2 in Wuhan, China: a 12-person case series. J Acquir Immune Defic Syndr 2020; 85:1–5.

4. Karmen-Tuohy S, Carlucci PM, Zervou FN, et al. Outcomes among HIV-positive patients hospitalized with COVID-19. J Acquir Immune Defic Syndr 2020; 85:6–10.

5. Sigel K, Swartz T, Golden E, et al. Coronavirus 2019 and people living with human immunodeficiency virus: outcomes for hospitalized patients in New York City. Clin Infect Dis 2020; 71:2933–8.

6. Boulle A, Davies M-A, Hussey H, et al. Risk factors for COVID-19 death in a population cohort study from the Western Cape Province, South Africa. Clin Infect Dis 2020; ciaa1198.

7. Meyerowitz EA, Kim AY, Ard KL, et al. Disproportionate burden of coronavirus disease 2019 among racial minorities and those in congregate settings among a large cohort of people with HIV. AIDS 2020; 34:1781–7.

8. City of Chicago. COVID dashboard. https://www.chicago.gov/content/city/en/sites/covid-19/home/covid-dashboard.html. Accessed 12 January 2021.

9. Ayerdi O, Puerta T, Clavo P, et al. Preventive efficacy of tenofovir/emtricitabine against SARS-CoV-2 among PREP users. Open Forum Infect Dis 2020; XXX-XXX.

10. Brown LB, Spinelli MA, Gandhi M. The interplay between HIV and COVID-19: summary of the data and responses to date. Curr Opin HIV AIDS 2021; 16:63–73.

11. Shiau S, Krause KD, Valera P, Swaminathan S, Halkitis PN. The burden of COVID-19 in people living with HIV: a syndemic perspective. AIDS Behav 2020; 24:2244–49.

12. Turner NA, Pan W, Martinez-Bianchi VS, et al. Racial, ethnic, and geographic disparities in novel coronavirus (severe acute respiratory syndrome coronavirus 2) test positivity in North Carolina. Open Forum Infect Dis 2021; 8:XXX–XX.

13. Silver V, Chapple AG, Feibus AH, et al. Clinical characteristics and outcomes based on race of hospitalized patients with COVID-19 in a New Orleans cohort. Open Forum Infect Dis 2020; 7:XXX–XX.

14. Moore JT. Disparities in incidence of COVID-19 among underrepresented racial/ethnic groups in counties identified as hotspots during June 5–18, 2020 — 22 States, February–June 2020. MMWR Morb Mortal Wkly Rep 2020; 69:1122–6.