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Viral suppression rates in a safety-net HIV clinic in San Francisco destabilized during COVID-19

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Summary:

The COVID-19 pandemic is expected to hinder U.S. End the HIV Epidemic goals. We evaluated viral suppression and retention-in-care before and after telemedicine was instituted, in response to shelter-in-place mandates, in a large, urban HIV clinic. The odds of viral non-suppression were 31% higher post-shelter-in-place (95% Confidence Interval=1.08–1.53) in spite of stable retention-in-care and visit volume, with disproportionate impact on homeless individuals. Measures to counteract the effect of COVID-19 on HIV outcomes are urgently needed.

Introduction:

The COVID-19 pandemic is expected to hinder U.S. End the HIV Epidemic (EHE) goals[1] via disruptions in care. Transition to phone or video visits in HIV clinics during shelter-in-place ordinances could prove particularly difficult for vulnerable populations who rely on clinic-based social support services and for whom telemedicine is less accessible.

Ward 86 is a safety-net clinic in San Francisco (SF) serving people with HIV (PWH) on publicly-funded insurance; our population has a high prevalence of mental illness, substance use and unstable housing.[2] On March 17, 2020, the city put a moratorium on routine medical care appointments[3] one day following the SF shelter-in-place ordinance.[4] Ward 86 immediately instituted a telemedicine model for primary care. We examined trends in viral non-suppression and retention-in-care for PWH after the SF shelter-in-place ordinance in our large, urban clinic.

Methods:

All clinic visits were transitioned to phone except when in-person visits were requested by providers or patients. Clinic management facilitated viral load testing via rapid laboratory visits, with at least quarterly monitoring recommended during shelter-in-place. This analysis compares viral loads and retention-in-care, defined as no-shows for scheduled in-person/telephone visits, before and during shelter-in-place (December 1, 2019-February 29, 2020

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vs. April 1, 2020-April 30, 2020).[5] To identify factors associated with non-suppressed viral load≥200 copies/ml and no-show visits, we used mixed effects logistic regression accounting for clustering across visits and lab draws. Factors for which the association with outcomes differed pre/post-shelter-in-place are presented with separate effect estimates by time-interval (interaction p-value of <0.1).[6]

Propensity Score Analysis for primary viral load outcome

As an alternate modelling strategy for the viral load outcome, we first constructed a propensity score model to estimate each patient's probability of having a viral load measured pre/during shelter-in-place, adjusting for: sex, race/ethnicity, primary language (English vs. non-English), and homeless status (all binary/categorical); while age and CD4+ count were included using cubic splines. After propensity scores were stratified into quintiles, we checked for evidence of interaction between the exposure and propensity scores; balance for key confounders was examined across these five strata. We then calculated the marginal odds ratio for viral non-suppression using post-estimation commands. Finally, to test the robustness of these findings we conducted a trimmed analysis restricted to the overlap between propensity scores in the pre/during-shelter-in-place groups.

Results:

Ward 86 averaged 1,836 visits/month over 2019. Overall, 344 of 1,766 (19%) individuals had unsuppressed viral loads at any point and 16% were homeless. After the transition to telemedicine, 54% of scheduled visits were telephone visits, although homeless individuals were offered telehealth for only 32% of visits (p<0.001). Pre-shelter-in-place, 1287 of 4153 visits (31%) were no-shows compared to 599 of 1997 (30%) post-shelter-in-place. Fewer no-shows occurred for telephone versus in-person visits (aOR 0.56 95% CI=0.36–0.86; Table). Younger individuals (age<35) were more likely to no-show pre-COVID-19 (aOR 1.57; 95% CI=1.28–1.93), but not during shelter-in-place (aOR 1.11; 95% CI=0.82–1.51). Homeless individuals had fewer no-shows during shelter-in-place (aOR 0.64; 95% CI=0.48–0.85) but not pre-COVID-19 (aOR 1.15; 95% CI=0.95–1.32).

For the viral load outcome, the odds of viral non-suppression were 31% higher during shelter-in-place [adjusted odds ratio (aOR) 1.31 95% confidence interval (CI)=1.08–1.53] than before COVID-19 in adjusted analyses. Viral non-suppression was also higher among homeless individuals during-COVID-19 (aOR 3.36; 95% CI=2.74–4.12) vs. pre-COVID-19 (aOR 2.27; 95% CI=1.91–2.71). Age< 35 years and Black vs White race were each associated with higher odds of viral non-suppression (aOR 1.29; 95%CI=1.11–1.51 and aOR 1.60: 95% CI=1.3–1.91, respectively), but these associations did not differ pre/post COVID-19 (p=0.49 and 0.93, respectively; Table). In the alternate modelling strategy using propensity scores, the association between shelter-in-place conditions and higher odds of viral non-suppression was nearly identical (aOR 1.32; 95% CI=1.14–1.51). Limiting the analysis to propensity scores within the region of overlap also had a minimal impact on results (aOR 1.31; 95% CI=1.14–1.51; Supplemental Appendix).

Discussion:

After institution of a shelter-in-place ordinance for COVID-19 in San Francisco, viral suppression rates fell substantially compared to pre-COVID-19 in a large HIV clinic serving vulnerable populations. The odds of viral non-suppression are now 31% higher than before the pandemic. This destabilization occurred despite our population attending telemedicine visits at a higher rate than expected, given the 60% drop in ambulatory care visit volume nationwide.[7] Telehealth visits, while offering greater patient convenience, may lead to less access to clinic-based social support services essential to achieving viral suppression among vulnerable groups.[8]

Concomitant with this explanation, homeless individuals at Ward 86 had higher odds of unsuppressed viral loads post-COVID-19 vs. pre-COVID-19, despite higher visit attendance. The disproportionate economic impact of the shutdown on those with housing instability, coupled with depopulation of San Francisco shelters with COVID-19 outbreaks,[9] are expected to destabilize viral suppression, despite ongoing or increased healthcare utilization by this group. Younger individuals had higher retention-in-care post-COVID-19, possibly related to comfort with telemedicine, but not higher viral suppression. Black individuals had persistent, unchanged disparities in viral suppression compared to White individuals, in spite of similar visit volume.

Limitations of our study included its non-randomized observational pre/post design and the short time intervals analyzed. We attempted to account for the possibility that individuals with worse HIV health status might be more likely to present for viral load monitoring by adjusting for markers of disease severity (e.g. CD4+count) in our propensity score model. This analysis did not substantially impact our estimates, although residual, unmeasured confounders could still exist. Studies over longer periods will be needed to understand the full impact of COVID-19 on HIV outcomes.

In conclusion, viral suppression rates fell during COVID-19 in an urban HIV clinic serving publicly-insured patients. Telemedicine may facilitate retention-in-care in the context of shelter-in-place for those without a digital divide, but is unlikely to compensate for the loss in clinic-based social services and support for PWH with vulnerabilities. In our population, retention-in-care via telemedicine was not sufficient to keep suppression rates stable. Loss of viral suppression is deleterious to the individual and hinders treatment-as-prevention: the COVID-19 pandemic is threatening the goals of the U.S. EHE initiative. Measures to counteract the effect of COVID-19 on HIV care outcomes are urgently needed.[10, 11]

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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maintained the clinical database. M.G. and D.H. oversaw clinical research operations. All authors reviewed the manuscript and provided edits.

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Table:

Factors Associated with Unsuppressed Viral load and No-show Visits Before and After Shelter-in-Place/ COVID-19[1]

Factor	Unsuppressed Viral Load Adjusted Odds Ratio; 95% Confidence Interval	No-show Visit Adjusted Odds Ratio; 95% Confidence Interval
Post-COVID-19 vs. Pre-COVID-19	1.31; 1.08–1.53	0.91; 0.77–1.09
Age under 35[1]	1.29; 1.11–1.51	1.57; 1.28–1.93 (Pre-COVID-19) 1.11; 0.82–1.51 (Post-COVID-19)
Female vs. male birth sex	0.94; 0.77–1.15	0.99; 0.80–1.21
Race/ethnicity vs. White		
Black	1.60; 1.33–1.91	1.14; 0.94–1.38
Latinx	1.04; 0.63–1.34	1.06; 0.88–1.27
Asian	0.92; 0.63–1.34	1.16; 0.82–1.64
Other	0.96; 0.78–1.19	0.97; 0.77–1.24
Homeless housing status[1]	2.27; 1.91–2.71 (Pre-COVID-19) 3.36; 2.74–4.12 (Post-COVID-19)	1.15; 0.95–1.32 (Pre-COVID-19) 0.64; 0.48–0.85 (Post-COVID-19)
Telephone vs. in-person visits (post-COVID-19 only)	-	0.56; 0.36–0.86

[1]Each factor was tested for an interaction with the pre/post COVID-19 time interval indicator. Adjusted odds ratios and 95% confidence intervals are presented separately for before and during COVID-19 time intervals if the test of interaction p-value was <0.1.[6]