




Characterization of people living with HIV in a Montreal-based tertiary care center with COVID-19 during the first wave of the pandemic

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Respiratory infection in HIV

Despite the success of antiretroviral therapy (ART), people living with HIV (PLWH) continue to suffer from a higher incidence of influenza, bacterial pneumonia, tuberculosis and other pulmonary infection

PLWH continue to have sub-optimal immune responses even despite ART (poor response to many vaccines and worse outcomes following respiratory disease)

Despite well-controlled HIV, PLWH have altered pulmonary immune cell response compared to HIV-uninfected individuals

COVID-19 infection and HIV:

Evidence to date is mixed with regards to whether PLWH are at increased risk of COVID-19 infection and whether they may have poorer outcomes vs. persons without HIV infection

PLWH may be at increased risk of COVID-19 due to:

- Immunodeficiency
- greater comorbidity and smoking
- reduced socioeconomic status (less ability to isolate)
- ethnic variations

Conversely, PLWH may be at reduced risk of COVID-19 due to:

- Less likely to mount cytokine storm
- More likely to adhere to quarantine for concern of their own health
- Less likely to be employed

METHODOLOGY

Chart review of all PLWH followed at the with positive COVID-19 test or symptoms suggestive of COVID-19

All CVIS staff (MDs, nurses, social workers, admin staff) were asked to report to clinic nurses cases of confirmed or suspected COVID-19 between March 15-June 15, 2020 (wave 1) and between March 16-2020-January March 2021.

Demographic, clinical and HIV-related data was extracted from electronic medical records, in addition to potential COVID-19 exposures, symptoms and outcomes

As part of standard of care, clinic nurses followed up with patients via telephone to verify their clinical status, need for medical intervention and ensure adherence to public health measures

Also opportunity to confirm missing data elements (ie, date of symptom onset, symptoms, location/result of testing, exposures)

OBJECTIVES

Primary objective:

To characterize PLWH attending the Chronic Viral Illness Service (CVIS) who acquired COVID-19 during wave 1 of the COVID-19 pandemic

Secondary objectives:

To compare characteristics of PLWH attending the CVIS who acquired COVID-19 during wave 1 vs wave 2 of the pandemic

To identify groups of PLWH attending the CVIS who *may* be at increased risk for adverse outcomes following COVID 19 infection during subsequent waves of the pandemic

Possible opportunity to implement quality improvement measures

Table 1: Demographics of PLWH attending the CVIS during waves 1 and 2 of the pandemic

| Demographics | Wave 1 N=32 | Wave 2 N=48 | P |
|---|----------------|----------------|---------|
| Age in years, median [IQR] | 52 [40,62] | 51 [41,57] | 0.326 |
| Gender# n (%) | | | 0.157 |
| Male | 18 (56%) | 33 (72%) | |
| Female | 14 (44%) | 12 (28%) | |
| Ethnicity [§] , n (%) | | | 0.349 |
| Black | 16 (50%) | 20 (43%) | |
| White | 9 (28%) | 16 (34%) | |
| Hispanic | 4 (13%) | 4 (9%) | |
| Indigenous & others | 1 (3%) | 7 (15%) | |
| Immigration status [§] , n (%) | | | 0.026* |
| Canadian citizen | 18 (56%) | 22 (47%) | |
| Permanent resident | 1 (3%) | 13 (28%) | |
| Asylum seeker | 9 (28%) | 11 (23%) | |
| Visiting student & others | 2 (7%) | 1 (2%) | |
| Years in Canada®, median [IQR] | 12 [3, 17] | 14.5 [2,32] | 0.476 |
| Highest level of education [€] , n (%) | | | 0.001** |
| College/Grad school/Diploma | 3 (10.7%) | 18 (47.4%) | |
| High school | 2 (7.1%) | 6 (15.8%) | |
| Elementary/secondary school | 23 (82.1%) | 14 (36.8%) | |
| Annual income [¥] , CAD \$ | | | 0.115 |
| <15,000 | 19 (63.3%) | 22 (59.5%) | |
| 15,000-34,999 | 10 (33.3%) | 8 (21.6%) | |
| 35,000 & above | 1 (3.3%) | 7 (18.9%) | |
| COVID-19 risk factor [∞] , n (%) | | | 0.185 |
| Works/lives in LTC home | 11 (34%) | 4 (9%) | |
| PSW/Nurse/Janitor | 9 (22%) | 1 (2%) | |
| Resident | 5 (16%) | 5 (11%) | |
| Homeless | 4 (13%) | 4 (9%) | |
| Comorbidities [®] , n (%) | | | 0.563 |
| Hypertension | 11 (34%) | 4 (9%) | |
| Dyslipidemia | 7 (22%) | 5 (11%) | |
| Diabetes Type 2 | 8 (25%) | 3 (6%) | |
| Asthma | 1 (3%) | 2 (4%) | |
| Body Mass Index, median [IQR] | 28 [24,33] | 27 [26,29] | 0.738 |
| Current tobacco smoker, n (%) | 7 (22%) | 3 (6%) | 0.081 |

Table 2: HIV-related characteristics of PLWH with COVID-19 during wave 1 and 2

| | Wave 1 N=32 | Wave 2 N=47 | P value |
|--|--------------------|----------------------|------------|
| Duration of HIV infection in years, median [IQR] | 17 [7,22] | 15 [10,21] | 0.786 |
| Individuals prescribed ART, n (%) | 30 (94) | 46 (98%)* | 0.563 |
| Years on ART, median [IQR] | 8 [3,15] | 12 [6, 21] | 0.064 |
| ART regimen, n (%) | % out of 24 | % out of 46 | 0.300 |
| Protease inhibitor-based | 7 (26%) | 5(11%) | |
| Non-nucleotide reverse transcriptase inhibitor-based | 3 (9%) | 2 (43%) | |
| Integrase inhibitor-based | 24 (75%) | 39 (85%) | |
| CD4 T cell count [€] (cells/mm3), median [IQR] | 566 [347,726] | 649 [418,833] | 0.312 |
| CD4/CD8 ratio [€] , median [IQR] | 0.6 [0.3,1.0] | 0.8 [0.5, 1.0] | 0.201 |
| Viral load [¥] if detectable (copies/ml) median (range) | 67,928 (40-620396) | 138 (range 73-25046) | 0.606 |

Table 3: COVID-19 infection parameters and outcomes of PLWH during wave 1 and 2

| | Wave 1 N=32 | Wave 2 N=47 | P value |
|---|-------------------|-----------------------|---------|
| Data not available, n (%) | 2 (6.25%) | 4 (8.5%) | |
| Asymptomatic, n (%) | 5 (16.6%) | 3 (6.8%) | 0.257 |
| Symptomatic, n (%) | 25 (83%) | 41 (93.2%) | |
| (wave 1: % out of 30 persons with data available; wave 2: % out of 44 persons with data available) | | | |
| Presenting with symptoms, n (%) out of 25 symptomatic patients with data available | | | |
| Fever | 9 (36%) | 15 (36.5%) | 0.962 |
| Cough | 10 (40%) | 26 (63.4%) | 0.064 |
| Sore throat | 5 (20%) | 5 (12.2%) | 0.485 |
| Shortness of breath | 3 (12%) | 12 (29.2%) | 0.104 |
| Sinusitis/rhinitis | 2 (8%) | 4 (9.7%) | 0.999 |
| Headache | 6 (24%) | 9 (22%) | 0.847 |
| Fatigue | 7 (28%) | 7 (17%) | 0.292 |
| Myalgias | 2 (8%) | 13 (31.7%) | 0.026* |
| Loss of taste/smell | 3 (12%) | 11 (26.8%) | 0.153 |
| Diarrhea | 2 (8%) | 3 (7.3%) | 0.999 |
| Severity on presentation, n (wave 1: % out of 25 symptomatic individuals for whom data is available; wave 2: % out of 41 symptomatic individuals for whom data is available) | | | 0.015* |
| Mild | | | |
| Moderate | 3 (12%) | 33 (80.5%) | |
| Severe | 2 (8%) 3 (12%) | 1 (2.4%) 7 (17.1%) | |
| Admitted to hospital for COVID-19, n (wave 1: % out of 30 individuals for whom data was available); wave 2: % out of 44 individuals for whom data available) | 3 (10%) | 10 (22.7%) | 0.158 |
| Full recovery, n (wave 1: % out of all 32 individuals with COVID-19; wave 2: % out of all 47 individuals with COVID-19) | 24 (75%) | 45 (95.7%) | 0.012 |
| Death, n (wave 1: % out of all 32 individuals with COVID-19; wave 2: % out of all 47 individuals with COVID-19) | 3 (9%) | 2 (4.25%) | 0.390 |

Results Continued

3 patients died during the 1st wave:

- Not confirmed death due directly to COVID-19, but highly probable
- In 1 case, COVID-19 was nosocomially acquired

2 patients died during the 2nd wave:

- Both suffered from significant mental health issues and both were lost-to-follow-up

CONCLUSIONS:

As in wave 1, a large proportion of PLWH with COVID-19 were of black ethnicity, low socioeconomic status, and worked in jobs that put them at high risk of COVID-19 exposure

In wave 2, individuals had a higher level of education attained, more reported myalgias and more presented with either mild or severe disease compared to wave 1

Many of the PLWH had comorbidities which are known to be risk factors for COVID-19, especially in wave 1

DISCUSSION AND AREAS FOR POSSIBLE INTERVENTION:

Telemedicine in the COVID-19 era for HIV: Is it effective for all populations?

- lost-to-follow-up at our clinics

Asylum seekers and refugees: May have challenges with privacy, internet access, etc

- May not want to share personal data in this manner

Delays in processing of immigration dossiers, delays in hearing

- Mental health deterioration, especially if baseline comorbidities, “COVID stress syndrome” and adjustments disorders
- Worse due to isolation, may impact ART adherence

Intimate partner violence-women with HIV at greater risk than HIV-uninfected women at baseline and may be accentuated during lockdowns

- Do women living with HIV have the tools they require to flee a dangerous situation?

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