# COVID-19-associated ART disruptions and HIV suppression: a population-based study in Uganda

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## BACKGROUND

- Following confirmation of SARS-CoV-2 in Uganda, a national lockdown was imposed. Subsequent movement restrictions may have limited access to HIV services, including antiretroviral therapy (ART).
- We assessed the population burden of COVID-19 pandemic associated ART disruptions and their potential impacts on viral load suppression (VLS) among people living with HIV who self-reported taking ART in Uganda.

## METHODS

- We used cross-sectional data collected between October 2020 and March 2023 from the Rakai Community Cohort Study (RCCS), a population-based HIV surveillance cohort in southern Uganda, to assess occurrence of COVID-19-related ART disruptions and impact on VLS (<1,000 RNA copies/ml).

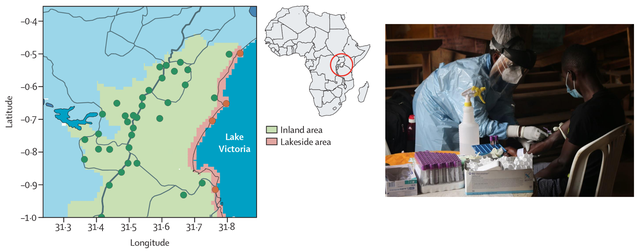



**Figure 1**. (Left) RCCS surveillance area, including 30 semi-urban and agrarian communities and 4 Lake Victoria fish landing sites. (Right) RCCS participant undergoing a blood draw for HIV serologic and viral load testing.

- Participants were asked to self-report ART disruptions in the year preceding COVID-19 emergence (March 2019 – March 2020) and after its emergence (March 2020 to interview date).
- Disruptions included missed HIV care appointments, running out of ART before the next refill, and reducing ART use to conserve medication supply.
- Proportions of participants reporting ART disruptions before and after the start of COVID-19 lockdown were compared using McNemar's test.
- Log-binomial regression models were used to estimate associations (adjusted prevalence risk ratios [PRR] and 95% confidence intervals [CI]) between demographic factors and ART disruptions since COVID-19 and viral load suppression status (<200 copies/ml defined as suppressed).

ART disruptions among persons living with HIV increased significantly following COVID-19 emergence.

While viral load suppression among persons living with HIV and on ART was high following COVID-19, those reporting disruptions were significantly less likely to be suppressed

## RESULTS

- Overall, 2,634 of 2,786 (94.5%) participants self-reported being on ART at time of survey.
- Of these, 4.8% (n=126) self-reported any ART disruptions prior to COVID-19 emergence, and 13.5% (n=355) after COVID-19 emergence (**Table 1**).
- Females, fishing community residents, persons <35 years, and persons with a prior self-reported history of ART disruption before COVID-19 were significantly more likely to report an ART disruption following COVID-19 emergence (**Table 2**).

**Table 1.** ART disruption experiences before and after COVID-19 among 2,634 participants living with HIV and self-reporting ART use in the Rakai Community Cohort Study, 2020-2023

| Type of ART disruption | Experienced in the one year prior to COVID-19 | Experienced since COVID-19 | McNemar Test p-value |
|---|---|---|---|
| Missed scheduled visit for HIV care | 86 (3.3) | 258 (9.8) | <0.001 |
| Run out of ART before next refill | 61 (2.3) | 142 (5.4) | <0.001 |
| Taken ART pills less frequently / in smaller amounts to conserve supply | 28 (1.1) | 66 (2.5) | <0.001 |
| **Any ART disruption** | **126 (4.8)** | **355 (13.5)** | **<0.001** |

**Table 2.** Factors associated with any ART disruption experiences since COVID-19 among 2,634 participants living with HIV and self-reporting ART use in the Rakai Community Cohort Study, 2020-2023

| Predictor variable | Number reporting any ART disruption/ Total (%) | Unadjusted PRR (95%CI) | p-value | Adjusted PRR (95%CI)* | p-value |
|---|---|---|---|---|---|
| **Sex** | | | | | |
| **Male** | 107/983 (10.9) | Ref. | - | Ref. | - |
| **Female** | 248/1651 (15.0) | 1.38 (1.12-1.71) | 0.003 | 1.42 (1,15-1.77) | 0.002 |
| **Community type** | | | | | |
| **Inland community** | 118/1189 (9.9) | Ref. | | Ref. | - |
| **Fish landing site** | 237/1445 (16.4) | 1.65 (1.35-2.04) | <0.001 | 1.66 (1.35-2.05) | <0.001 |
| **Age group** | | | | | |
| **15-24** | 25/143 (17.5) | 1.02 (0.67-1.47) | 0.932 | 1.05 (0.70-1.51) | |
| **25-34** | 133/775 (17.2) | Ref. | - | Ref. | Ref. |
| **35-44** | 155/1180 (13.1) | 0.77 (0.62-0.95) | 0.014 | 0.83 (0.67-1.03) | 0.093 |
| **45+** | 25/536 (7.8) | 0.46 (0.32-0.63) | <0.001 | 0.53 (0.38-0.74) | <0.001 |
| **Self-reported history of any ART disruption prior to COVID-19 emergence** | | | | | |
| **No ART disruption history** | 269/2508 (10.7) | Ref. | - | - | - |
| **ART disruption history** | 86/126 (68.3) | 6.36 (5.37-7.46) | <0.001 | - | - |

*Models adjusted for age, community type, and gender.

## RESULTS

- Overall, 95.1% (n=2503**)** of participants were virally suppressed.
- Those who reported experiencing ART disruption following COVID-19 emergence were less likely to be suppressed than those who did not experience any disruption **(Table 3)**

**Table 3:** Experience of ART disruption during COVID-19 and viral load suppression status among 2,634 participants in the RCCS living with HIV and self-reporting ART use, 2020-2023

| Group | No disruption since COVID-19 | Experienced disruption since COVID-19 | Adjusted PRR (95%CI)* | p-value |
|---|---|---|---|---|
| | Viremic/Total (%) | Viremic/Total (%) | | |
| **Overall** | **102/2277 (4.7)** | **27/355 (7.6)** | **1.55 (1.01-2.20)** | **0.034** |
| Men | 55/876 (6.3) | 13/107 (12.1) | 1.81 (0.98-2.67) | 0.041 |
| Women | 47/1401 (3.3) | 14/248 (5.6) | 1.33 (0.72-2.30) | 0.332 |
| Inland community | 38/1069 (3.6) | 5/118 (4.2) | 1.38 (0.56-4.10) | 0.485 |
| Fish landing site | 64/1208 (5.3) | 22/237 (9.3) | 1.62(1.00-2.51) | 0.040 |
| <35 years | 58/759 (7.6) | 20/158 (12.7) | 1.67 (1.01-2.64) | 0.033 |
| ≥35 years | 44/1518 (2.9) | 7/197 (3.6) | 1.28 (0.53-2.63) | 0.536 |
| No ART disruption history | 99/2237 (4.4) | 19/269 (7.1) | 1.41 (0.63-3.03) | 0.354 |
| ART disruption history | 3/40 (7.5) | 8/86 (9.3) | 1.26 (0.40-5.51) | 0.712 |

*Models adjusted for age, community type, and gender.

## CONCLUSIONS

- Among people self-reporting ART use, ART disruptions, including missed HIV care appointments and running out of ART, increased significantly following COVID-19 emergence in Uganda.
- VLS was significantly lower among ART-experienced individuals who reported ART disruptions since COVID-19.
- Developing interventions effective in maintaining care engagement for people living with HIV is crucial to mitigate treatment disruptions during future pandemics.

## ADDITIONAL KEY INFORMATION

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