HIV Drug Resistance in Female Sex Workers from the Dominican Republic and Tanzania

Wendy Greenawalt1, Jessica M. Fogel1, William Clarke1, Autumn Breadi1, Jessie Mbwambo1, Samuel Likindikoki2, Said Aboud1, Yeycy Donastorg3, Martha Perez3, Clare Barrington4, Wendy Davis5, Mark A. Marzinke1, Noya Galai2, Deanna Kerrigan6, and Susan H. Eshleman1

1Johns Hopkins University School of Medicine, Baltimore, MD, USA; 2Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania; 3Instituto Dermatologico y Cirugia de la Piel, Dominican Republic; 4University of North Carolina, Chapel Hill, NC; 5American University, Washington, DC, USA.

BACKGROUND

Female sex workers (FSW) are at high risk of HIV infection and sex work is known to play an important role in HIV transmission dynamics. Low socioeconomic status, gender discrimination, and stigma associated with HIV and sex work may limit access to HIV care for FSW. We analyzed HIV drug resistance among HIV-infected FSW in the Dominican Republic (DR) and Tanzania who are enrolled in an ongoing longitudinal study of the social determinants of HIV outcomes.

METHODS

Study Cohort

Among 410 participants, 144 (35.1%) had a viral load >1,000 copies/mL at enrollment (50 from the DR, 94 from Tanzania). These 144 participants were included in the analysis of drug resistance and antiretroviral (ARV) drug use (Figure 1).

Laboratory Methods

Viral load testing was performed at the study sites. HIV genotyping was performed using the ViroSeq HIV-1 Genotyping System, v2.0, and the ViroSeq HIV-1 Integrase Genotyping Kit, RUO. ARV drug testing was performed using a qualitative assay that detects 22 drugs in five drug classes.

RESULTS

Genotyping results were obtained for 138 (95.8%) of 144 participants. Major drug resistance mutations were detected in 54 (39.1%) of the 138 samples; 27 (19.6%) had non-nucleoside reverse transcriptase inhibitor (NNRTI) resistance, 32 (23.2%) had nucleoside/nucleotide reverse transcriptase inhibitor (NRTI) resistance, two (1.4%) had protease inhibitor (PI) resistance, and 29 (21.0%) had multi-class resistance (Figure 2). None of the 29 samples with multi-class resistance had mutations conferring resistance to integrase strand transfer inhibitors (INSTIs). The most common major drug resistance mutations detected at both sites were K103N (38/138 [27.5%]) and M184V (30/138 [21.7%]).

At least one ARV drug was detected in samples from 36 (25.0%) of 144 participants (19/94 [20.2%] from Tanzania, 17/50 [34.0%] from the DR). NNRTIs were detected in 27 (18.8%) of the samples, NRTIs were detected in 30 (20.8%) of the samples, and PIs were detected in five (3.5%) of the samples. An INSTI was detected in one sample from the DR.

• HIV drug resistance was detected in samples from ~40% of FSW in a cohort from the DR and Tanzania; resistance to PIs, NNRTIs, and NRTIs was detected; >20% of the participants had multi-class resistance.
• One quarter of the women had laboratory confirmation of ARV drug use.
• Of those with ARV drugs detected, ~90% had HIV drug resistance and ~80% had multi-class resistance.
• Resistance was associated with detection of ARV drugs, self-reported ART adherence, and duration of HIV infection.
• INSTI drugs may be a viable option for ongoing treatment in this population.

The frequency of multi-class resistance was also higher among those with ≥1 ARV drug detected (25/31 [80.6%] vs. 4/23 [17.4%] with no drugs detected, p=0.008).

In a multivariable model, resistance was associated with longer duration of HIV infection, both full and partial self-reported antiretroviral treatment (ART) adherence, and laboratory detection of ARV drugs (Table 1).

Table 1. Association between demographic and other factors and HIV drug resistance among HIV-infected FSW in the Dominican Republic and Tanzania

<table>
<thead>
<tr>
<th>Factor</th>
<th>Estimates</th>
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<tbody>
<tr>
<td>Both classes combined (N=132)**</td>
<td>OR</td>
</tr>
<tr>
<td>Duration of HIV infection</td>
<td>1.14</td>
</tr>
<tr>
<td>ARV in blood - lab</td>
<td>12.79</td>
</tr>
<tr>
<td>ART adherence: Full *</td>
<td>6.14</td>
</tr>
<tr>
<td>ART adherence: Partial *</td>
<td>13.37</td>
</tr>
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Area under ROC (C-statistic) = 91.16%.

** The final model included: country, age, travel in the last 6 months, having ≥3 live births, high stigma score (>36), any gender-based violence in the last 6 months, and having stopped ART ever. These factors were not significantly associated with drug resistance and were not included in the final multivariate model.

CONCLUSIONS

• High rates of HIV drug resistance were observed among FSW in the DR and Tanzania, including high rates of multi-class resistance.
• Drug resistance was associated with duration of infection, self-reported ART adherence, and detection of ARV drugs.
• INSTIs are still a viable treatment option for these women, since no INSTI resistance was detected in this cohort.
• These findings highlight an ongoing need for improved HIV care in this vulnerable population.

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