ARV DRUG USE AND HIV DRUG RESISTANCE AMONG MSM IN SUB-SAHARAN AFRICA (HPTN 075)

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BACKGROUND

African men who have sex with men (MSM) and transgender women are at increased risk of HIV infection and may have limited access to quality health care because of social discrimination, stigmatization, or criminalization. The HIV Prevention Trials Network (HPTN) 075 evaluated the feasibility of recruiting and retaining MSM in sub-Saharan Africa, in preparation for HIV prevention trials. The study enrolled HIV-infected and HIV-uninfected participants in three countries (Kenya, Malawi, and South Africa). In this study, we analyzed antiretroviral (ARV) drug use and HIV drug resistance among HIV-infected participants screened for participation in HPTN 075.

METHODS

STUDY COHORT

This study retrospectively analyzed samples and data from the screening visit for 598 participants. The participants included in this analysis met the following study criteria: age 18 to 44 years, male sex assigned at birth, ever having had sex with a man, willingness to be tested for HIV infection, and had confirmed HIV infection at screening. Overall, 183 (30.6%) of 598 participants had confirmed HIV infection at screening.

LABORATORY TESTING

ARV drug testing was performed using a qualitative assay based on high-performance liquid chromatography coupled with high-resolution accurate mass mass spectrometry. This assay detects 20 ARV drugs from five drug classes:

- Nine protease inhibitors
- Six nucleoside/nucleotide reverse transcriptase inhibitors (NRTIs)
- Three non-nucleoside reverse transcriptase inhibitors (NNRTIs)
- One CCR5 receptor antagonist
- One integrase strand transfer inhibitor

HIV viral load was measured for participants who had ARV drugs detected. Viral suppression was defined as a viral load <400 copies/mL.

HIV drug resistance testing was performed using the ViroSeq HIV-1 Genotyping Assay v3.0 for participants who had ARV drugs detected with a viral load ≥400 copies/mL.

RESULTS

DETECTION OF ARV DRUGS

At least one ARV drug was detected in samples from 63 (34.4%) of the 183 HIV-infected participants, including 19 from Kisumu, 10 from Blantyre; 11 from Cape Town, and 23 from Soweto (Table 1).

NNRTIs and NRTIs were the only classes of ARV drugs detected (Table 1). Two or more ARV drugs were detected in 57 (90.5%) of the 63 cases, consistent with use of a multi-drug regimen for ART; two participants had combinations of ARV drugs that were not consistent with recommended treatment regimens. The remaining six participants had a single ARV drug detected (all six had EFV detected alone).

Table 1. Antiretroviral drug(s) detected in HIV-infected participants at study screening.

	Viral load <400 copies/mL (N=52)	Viral load ≥400 copies/mL (N=11)	Total (N=63)
1 ARV drug			
EFV	2	4	6
2 ARV drugs			
NVP+3TC	0	2	2
EFV+3TC	1	0	1
EFV+FTC	1	0	1
3 ARV drugs			
NVP+3TC+TFV	1	1	2
EFV+3TC+TFV	21	3	24
EFV+FTC+TFV	23	1	24
EFV+3TC+ABC	1	0	1
4 ARV drugs			
EFV+NVP+TFV+FTC	1	0	1
EFV+3TC+TFV+FTC	1	0	1

Antiretroviral drugs: EFV: efavirenz; NVP: nevirapine; 3TC: lamivudine; TFV: tenofovir; FTC: emtricitabine; ABC: abacavir.

FACTORS ASSOCIATED WITH DETECTION OF ARV DRUGS

ARV drugs were detected more frequently among participants who reported being engaged in HIV care or any current or prior ARV drug use (compared to those who did not report being in HIV care or any ARV drug use; 88.5% vs. 9.8%, p<0.001).

Other factors that were statistically associated with detection of ARV drugs included older age (48.8% >25 years vs. 22.8% ≤25 years, p=0.019), and study site (67.9% in Kisumu, Kenya [reference], vs. 37.0% in Blantyre, Malawi (p=0.003), 25.0% in Cape Town, South Africa (p=0.022), and 27.4% in Soweto, South Africa (p=0.016).

VIRAL SUPPRESSION

HIV viral load testing was performed for the 63 participants who had ARV drugs detected; 11 (17.5%) of the participants were not virally suppressed (Figure 1). The median viral load for the 11 participants was 2,200 copies/mL (range: 430 to 31,650). These 11 cases included four where EFV was the only ARV drug detected and seven where two or three ARV drugs were detected.

HIV DRUG RESISTANCE

HIV genotyping was performed for the 11 participants who had ARV drugs detected and were not virally suppressed. At least one major drug resistant mutation was detected in six of the 11 cases (Figure 1, Table 2). One participant had NNRTI resistance only, one participant had NRTI resistance only, and four participants had multi-class resistance. The most frequently detected mutations were M184V/I (N=5) and K103N (N=3). Seven of these 11 men were at risk of acquiring resistance to additional ARV drugs over time.

Figure 1. Summary of study findings.

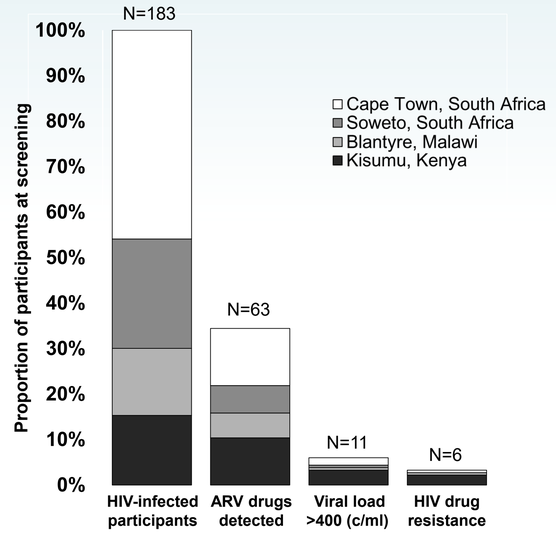

Table 2. HIV drug resistance in HIV-infected participants who had ARV drug(s) detected at screening and were not virally suppressed.

Case	Viral load (copies/mL)	Study site	ARV drug(s) detected		HIV drug resistance mutations	
			NNRTI	NRTI	NNRTI mutations	NRTI mutations
1	2,930	Kisumu, Kenya	EFV	-	None	None
2	430	Cape Town, South Africa	EFV	-	None	None
3	570	Cape Town, South Africa	EFV	-	None	None
4	17,520	Cape Town, South Africa	EFV	-	K103N, V106M	M184I
5	10,230	Kisumu, Kenya	NVP	3TC	None	M184I
6	18,900	Kisumu, Kenya	NVP	3TC	K103N	M184V
7	31,650	Kisumu, Kenya	NVP	3TC+TFV	Y181C, G190A	M184I
8	2,200	Blantyre, Malawi	EFV	3TC+TFV	V106M	M184V
9	480	Kisumu, Kenya	EFV	3TC+TFV	K103N	None
10	1,730	Kisumu, Kenya	EFV	3TC+TFV	None	None
11	490	Soweto, South Africa	EFV	FTC+TFV	None	None

Antiretroviral drugs: EFV: efavirenz; NVP: nevirapine; 3TC: lamivudine; TFV: tenofovir; FTC: emtricitabine.

CONCLUSIONS

Among HIV-infected participants screened for participation in HPTN 075, 65.6% were not on ART at the screening visit.

Among HIV-infected participants who were on ART, 17.4% were not virally suppressed.

More than half of those on ART who were not virally suppressed had drug-resistant HIV and many were at risk of acquiring additional resistance.

ARV drug use varied among the HPTN 075 study sites, and was associated with older age, and a report of engagement in HIV care or any current or prior ARV drug use.

These findings underscore the importance of improving HIV care for African MSM.

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