

HIV Transmission in Male Serodiscordant Couples in Australia, Thailand and Brazil

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Background

Numerous prospective studies have demonstrated that HIV transmission is greatly reduced in heterosexual HIV serodiscordant couples when the HIV-positive partner is receiving combination anti-retroviral therapy (cART) and has undetectable viral load. Comparable data in homosexual male serodiscordant couples are extremely limited.

We report a pre-specified interim analysis of the relationship between undetectable viral load and HIV transmission in the ongoing *Opposites Attract* observational cohort study of homosexual male serodiscordant couples from three cities in Australia (Sydney, Melbourne, and Brisbane), in Bangkok, Thailand, and in Rio de Janeiro, Brazil.

Method

Homosexual male serodiscordant couples reporting regular anal intercourse with each other were recruited through clinical sites. Detailed information on sexual risk behaviours was collected at each visit from the HIV-negative partner. HIV-negative partners were tested at baseline and follow-up for HIV antibodies and sexually transmitted infections (STIs), and HIV-positive partners were tested for HIV viral load and STIs. HIV incidence rates were calculated per couple-year of follow-up (CYFU) using person-year methods, and stratified by whether different forms of condomless anal intercourse (CLAI) were reported. Undetectable viral load was defined as less than 200 copies per millilitre. One-sided confidence intervals were calculated using the exact Poisson method. Linked HIV transmission in couples was defined by phylogenetic analysis.

Results

By December 2014, 234 homosexual male serodiscordant couples were enrolled: 135 from Australia, 52 from Bangkok and 47 from Rio de Janeiro. Median age was 36.1 years for HIV-negative partners and 35.9 years for HIV-positive partners. Over one-third of couples (38.7%) had been having sex with each other for less than 12 months, while 32.9% and 28.4% had been having sex with each other for 1-5 years and for over 5 years, respectively.

There were a total of 150.0 CYFU in 152 couples with at least one follow-up visit of whom 65 (42.8%) were in a non-monogamous relationship. At baseline, 84.2% of HIV-positive partners were on cART and in total 82.9% had undetectable viral load. STI prevalence was 11.2% in HIV-positive partners and 6.6% in HIV-negative partners.

There were 90.8 CYFU in periods where CLAI was reported with a total of 5,905 acts of CLAI in 88 couples. There were no linked HIV transmissions. The upper limit of the 95% confidence interval of the transmission rate was 4.06 per 100 CYFU for periods in which CLAI was reported, and 6.46 per 100 CYFU for periods in which receptive CLAI was reported.

Table 1: HIV incidence by category of condomless anal intercourse reported

Type of intercourse without a condom reported by HIV-negative partner	Linked transmissions (n)	Couple-years of follow up (CYFU)	No. of CLAI ^a acts	Incidence rate per 100 CYFU (95% CI)
Overall	0	149.96	5,905	0 (0-2.46)
Any CLAI	0	90.83	5,905	0 (0-4.06)
Insertive CLAI	0	77.87	3,569	0 (0-4.74)
Receptive CLAI	0	57.08	2,337	0 (0-6.46)
Any CLAI when VL^b <200 copies	0	88.59	5,656	0 (0-4.16)
Any CLAI when VL >200 copies	0	2.00	237	0 (0-184.31)

^a CLAI refers to condomless anal intercourse. ^b VL refers to viral load

Conclusions

There were no linked HIV transmissions in 150 CYFU in these homosexual male serodiscordant couples, despite close to six thousand acts of CLAI. The upper confidence limit of the transmission rate during follow-up in periods during which CLAI was occurring was 4.06 per 100 CYFU. These data add to emerging evidence that the rate of HIV transmission in homosexual male serodiscordant couples is very low when the HIV-positive partner is on cART and has undetectable viral load. Further follow-up of a larger sample size is required to accurately delineate any residual risk, and the *Opposites Attract Study* continues to recruit and follow-up homosexual male serodiscordant couples.

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