Correlates of HIV infection among female sex workers in Vietnam: Injection drug use remains a key risk factor

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ABSTRACT

Objective: Women who sell sex and use drugs have dual risks for HIV infection. Despite increasing reports of drug use among female sex workers (FSW) in Vietnam, FSW HIV interventions remain focused mainly on sexual risk reduction. We assessed the impact of drug use and inconsistent condom use on HIV infection among FSW in Vietnam, which few studies have quantified.

Methods: We surveyed 5298 women aged ≥18 years who had sold sex in the past month from ten geographically dispersed provinces. We performed multivariate logistic regression on data from provinces with high (≥10%) or low (<10%) HIV prevalence among FSW.

Results: Compared to FSW who never used illicit drugs, the odds of HIV infection among FSW who had ever injected drugs and those who reported non-injection drug use were 3.44 (CI 2.32–5.09) and 1.76 (CI 1.14–2.71), respectively, in high-prevalence provinces. FSW who always used condoms with clients had lower odds of HIV infection than those who did not (AOR = 0.71; CI 0.52–0.98). In low-prevalence provinces lifetime injection drug use (AOR 22.05, CI 12.00–40.49), but not non-injecting drug use or inconsistent condom use, was significantly associated with HIV infection.

Conclusions: Because injection drug use and inconsistent condom use were key risk factors for HIV infection in high-prevalence provinces, drug injection risk reduction should be as much a focus of HIV prevention as sexual risk reduction. Where HIV prevalence remains low in FSW, a more general emphasis on harm reduction for all drug users will benefit FSW.

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1. Introduction

Despite growing evidence linking injection drug use to HIV infection among female sex workers (FSW) globally (Agarwal et al., 1999; Benotsch et al., 2004; Karapetyan et al., 2002; McKeganey, 1994; Medhi et al., 2012; Nguyen et al., 2004, 2009b; Panda et al., 2001; Platt et al., 2007; Sosa-Estani et al., 2003; Strathdee et al., 2008; Tuan et al., 2007; Wang et al., 2009; Xu et al., 2012), sexual risk reduction remains the primary focus of prevention efforts among FSW (Semini et al., 2013; Shahmanesh et al., 2008). Recent reports indicating high prevalence of illicit drug use, including

non-injection use, among FSW in Southeast Asia suggest that drug use and sex work increasingly intersect in this region (Chhorvann and Liu, 2007; Couture et al., 2012; Liao et al., 2012; Medhi et al., 2012; National AIDS Control Program, 2011; Vietnam Administration of HIV/AIDS Control, 2006). In addition to the risk of acquiring HIV through unprotected sex and sexual violence by intimate partners and sex clients, FSW who use or inject drugs are at risk of HIV infection through re-use of injecting equipment and increased likelihood of unprotected sex while under the influence of drugs or experiencing withdrawal (El-Bassel et al., 2012; Maher et al., 2011).

In Vietnam FSW, people who inject drugs (PWID) and men who have sex with men constitute the majority of the estimated 260,000 people living with HIV. Epidemic modeling shows stabilizing HIV prevalence among the general population at 0.3%, but warns of increasing prevalence among FSW, currently at 7% nationally, in

Fig. 1. Map of Vietnam and the 10 survey provinces.

provinces with high rates of drug use (Vietnam Administration of HIV/AIDS Control, 2013). Surveys among FSW in Vietnam indicate that drug use, mostly measured as any illicit drug use but with some surveys including injection drug use, has increased rapidly since 1998 (Grayman et al., 2005; National AIDS Standing Bureau, 2001; Nemoto et al., 2008; Thuy et al., 1998; Tran et al., 2005a; Tuan et al., 2007; Vietnam Administration of HIV/AIDS Control, 2006). Consistent with the international literature, street-based FSW in Vietnam report higher levels of drug use, including injection drug use, than non-street-based FSW (Nemoto et al., 2008; Nguyen et al., 2009a, 2009b; Tran et al., 2005b; Vietnam Administration of HIV/AIDS Control, 2006).

Results from a limited number of studies indicate strong associations between HIV infection and lifetime illicit drug use among FSW in Vietnam (Nguyen et al., 2009b), drug injection (Nguyen et al., 2004; Tuan et al., 2007), and sharing of injecting equipment (Tuan et al., 2007). These studies were conducted in single locations or in a limited number of geographic regions and produced large variance on the measures of association. Previous studies have tended to focus on injection drug use and syringe sharing, but few studies have examined the role of non-injection drug use or reported a significant association between inconsistent condom use and HIV infection (Thuy et al., 1998; Tuan et al., 2007). In this study, we explore the extent to which FSW across Vietnam are at risk for HIV infection through unprotected sex and non-injection drug use and examine these effects in the context of the province and type of venue in which FSW work.

2. Methods

2.1. Data collection

During September, 2009–February, 2010, women aged ≥18 years who sold sex in the past month ($n = 5298$) were recruited using two-stage cluster sampling in ten provinces. The provinces were geographically dispersed and included four northern (Hanoi, Haiphong, Quangninh, Yenbai), two central (Danang, Nghean), and four southern (Angiang, Cantho, Ho Chi Minh City (HCMC), Dongnai) provinces (Fig. 1). Seven of these provinces were receiving a large amount of the United States' President's Emergency Plan for AIDS Relief (PEPFAR) support and, therefore, were selected to provide data to inform programming. In each province, two subpopulations of FSW, street-based sex workers (SSW) who recruited clients on the streets,

in parks, or other openly public spaces; and venue-based sex workers (VSW) who worked in entertainment or service establishments such as bars, cafés, restaurants, hotels or massage parlors, were sampled separately with a target sample size of 300 participants per subpopulation per province. Sample size calculations were powered to detect differences in key indicators from a previous IBBS survey (Vietnam Administration of HIV/AIDS Control, 2006). Separate SSW and VSW samples were obtained because of the higher risk of HIV documented among SSW (Nemoto et al., 2008; Nguyen et al., 2009a; Vietnam Administration of HIV/AIDS Control, 2006). Targeted sample sizes were reached or almost reached in most provinces. About half of the required sample size was reached for SSW in Cantho, Quangninh and SSW and VSW in Yenbai. Response rates were not obtained.

Prior to recruitment, locations where FSW congregated were mapped over two weeks, during which HIV outreach workers led study staff to hotspots to estimate the number of FSW at each location and inquire about and visit other locations not previously known. Separate sampling frames were created for SSW and VSW samples. The primary sampling unit was a cluster of locations, selected with probability proportional to size. In the second stage, survey participants were recruited at locations in the selected clusters (Family Health International, 2000). Self-weighted samples were obtained for all provinces except HCMC and Cantho, where recruitment numbers by cluster differed from their designated sample sizes, so we conducted weighted analysis to adjust for the unequal number of sex workers in the primary units (Karon and Wejnert, 2012). For SSW in Cantho, Quangninh and Yenbai and VSW in Yenbai, we recruited all eligible FSW encountered because the size estimate obtained through mapping was smaller than the targeted sample size.

Potential participants were offered invitational coupons to enroll in the survey at fixed study centers, located at governmental Provincial AIDS Centers (PAC) or houses specifically rented to facilitate recruitment. Trained PAC staff conducted individual structured face-to-face interviews with eligible participants who provided verbal voluntary informed consent. No personal identifying information was collected. Participants were remunerated 50,000–100,000 VND (2.7–5.5 USD) based on locale and consultation with FSW key informants during formative assessments. The questionnaire collected information on sociodemographic characteristics; sex work; condom use practices; drug related risks; self-perceived risks; HIV knowledge; incarceration history; and access to HIV services. Illicit drug use indicators included a series of questions on lifetime use of the following drug types: opium, heroin, valium/Seduxen/Benzo, ecstasy, methamphetamine, marijuana, ketamine, magic mushrooms, cocaine, and 'other' as specified by the respondent. The interviewer asked if each drug type was used at any time up to the time of the interview, and if the respondent answered yes, whether the drug was used in the past month. The second set of questions followed the same sequence about injection for each injectable drug type. Other drug-related questions included daily injection; having a sex partner who injected illicit drugs in the past month; ever sharing needles and syringes or other injecting equipment; sharing needles and syringes with a sex partner in the past month. Consistent condom use, defined as used condoms for every vaginal and anal sex act with clients in the past month, was obtained by asking how often condoms were used in the past month (i.e. all of the time, sometimes, rarely, never) by client type. HIV knowledge was measured using core indicators from the United Nations General Assembly Special Session on HIV/AIDS (UNAIDS, 2009) and an additional question about HIV acquisition through needle and syringe sharing.

Women were asked to provide venous blood samples for anonymous HIV testing and given appointment cards to return to receive their results and referrals for HIV care where indicated. Trained PAC laboratory staff performed venipuncture at the study centers. The PAC or Preventive Medicine Center in each province conducted HIV antibody testing using Genscreen HIV-1/2 (Bio-Rad) and confirmed by Determine HIV-1/2 test (Abbott Laboratories) and Murex HIV-1.2.O (Murex Biotech Ltd). The National Institute of Hygiene and Epidemiology (NIHE) provided external quality assurance on the testing. The study protocol was approved by the Institutional Review Boards of NIHE and the U.S. Centers for Disease Control and Prevention.

2.2. Statistical analysis

Simple frequencies were calculated for separate estimates by province and subpopulation. We calculated 95% confidence intervals (CI) for odds ratios and the population attributable risk (PAR) to show potential impact of reducing injection drug use. All statistical analyses were performed using STATA version 12.0 (StataCorp, 2011). Three mutually exclusive drug use categories were created from responses to questions on lifetime illicit drug use of all drug types: never used illicit drugs, ever used illicit drugs through non-injecting routes of administration, and ever injected illicit drugs.

We conducted random effects logistic regression to account for intra-cluster correlation in examining demographic characteristics, occupational characteristics, and sexual and drug risk factors associated with HIV seropositivity. We entered into the multivariate logistic regression models independent variables associated with HIV seropositivity at $p < 0.20$ from the bivariate analyses, then retained those variables with the Wald statistic of $p > 0.05$ in reduced models. We applied the likelihood ratio test to compare nested models. A total of twenty-four records with missing values for the explanatory variables were omitted from the models. For the predictor 'type of sex work', the variable entered into the models was the participants' response to whether or not they mainly negotiated sex on the streets and in other public spaces, rather than the subpopulation samples (SSW vs. VSW) into which participants were