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Research paper

Prevalence and risk factors associated with HIV and tuberculosis in people who use drugs in Abidjan, Ivory Coast

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ABSTRACT

Background: The number of people who use drugs (PWUD) has dramatically increased in West Africa over the last 15 years, but targeted interventions are falling behind, notably because of the lack of awareness of the health needs of PWUD. We aimed to assess prevalence and factors associated with HIV and other infections in PWUD in Abidjan, Ivory Coast, one of the countries most affected by HIV in Western Africa.

Methods: We used respondent-driven-sampling to obtain a representative sample of heroin or cocaine/crack users aged 18 years or more. Socio-behavioral data were obtained by face-to-face questionnaires. Blood samples were collected and tested for HIV. Two sputa were obtained in tuberculosis (TB) symptomatic participants for acid-fast-bacilli (AFB) smear testing. After a descriptive analysis, crude prevalence were calculated, then weighted to take account of the sampling method. Factors associated with HIV and TB were studied using adjusted log-binomial regression. Population size was estimated by capture–recapture.

Results: 450 PWUD were recruited in May 2014. The mean age was 33.5 years; 10.9% were women. Smoking was the main mode of consumption, ever injecting was reported by 12.7% of the participants (3.6% in the past month). Sex work was reported by 15.8% of the PWUD (13.7% of the men), and 10.2% of the men reported sexual relationships with other men (MSM). We found a weighted prevalence of 9.5% for HIV. Women were 3.4 times more likely to be infected than men. Among men, being a sex worker (SW) (adjusted OR 2.9 [95CI 1.06–7.98]) or MSM (adjusted OR 11.5 [95CI 4.22–31.42]) were the main factors associated with HIV infection in adjusted analysis. Injection was not associated with HIV. TB weighted prevalence was 1.8%, associated with poor living arrangements in adjusted analysis. We estimated that 3521; 95CI 3049–3993 PWUD live in Abidjan.

Conclusion: PWUD in Abidjan are at high risk of HIV due to sexual transmission, especially in women, SW and MSM who also use drugs. Interventions should be developed to improve HIV prevention and linkage to care in these specific populations. More generally, improving the health of PWUD involves a broader reflection on the living environment and access to health care of slum residents in large African cities.

Introduction

In West Africa, institutional weakness due to decades of political conflict has led to a worrying growth of cocaine and other drug trafficking. Local consumption has also dramatically increased, though the real extent of illicit drug use remains unknown. While efforts to address the problem have mostly focused on arrests of users and petty drug dealers, very few investments have been made in treatment and harm reduction services (WACD, 2014).

Yet drug use poses significant public health risks. Globally, injecting drug users (IDU) are disproportionately infected with HIV, with incidence estimated to be up to 22 times greater than in the general population (Mathers et al., 2008). Increased HIV prevalence is also reported in non-injecting drug users (NIDU), especially because of increased sexual risk behaviors, and overlapping social and sexual networks with IDU (Strathdee & Stockman, 2010). The small amount of data available in West Africa reports higher HIV rates in People who use drugs (PWUD) than in the general population (5.2% in Senegal, and between 3%

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and 9.3% in Nigeria) (Eluwa, Strathdee, Adebayo, Ahonsi, & Adebajo, 2013; Leprêtre et al., 2015). PWUD also remain disproportionately affected by viral hepatitis B and C (HBV, HCV), and syphilis (Coffin et al., 2010; Nelson et al., 2011). In addition, drug use is associated with a number of factors that together contribute to higher risks of tuberculosis (TB), including direct detrimental effect on the immune system, use of tobacco, homelessness, or repeated incarcerations (Deiss, Rodwell, & Garfein, 2009).

With a HIV prevalence of 3.7% in the general population, Ivory Coast is one of the most affected countries of West Africa (DHS, 2013). Abidjan, the main city, shows even higher rates, with an HIV prevalence estimated at 5.1% (DHS, 2013). The smoking of heroin "*Pao*" and crack cocaine "*Yo*" is very common in Abidjan, taking place most of the time in "*fumoirs*", which are insalubrious and crowded spaces dispersed within urban slums. Heroin is mainly used in a rolled cigarette of cannabis, whereas crack cocaine is smoked using handmade pipes "*Zeb*". Other, less frequent, consumption patterns are observed, such as chasing the dragon, snorting cocaine, or oral consumption of psychotropic pharmaceutical drugs (amphetamine pills known as "*Bleu bleu*", clonazepam "*Rivo*", barbiturate "*sekou touré*" and different ephedrine combinations). Injecting drug use exists, but is uncommon and deprecated by Ivorian PWUD.

Ivorian authorities are determined to develop a public health approach adapted to populations at high risk of HIV. They already work closely with sex workers (SW) and men having sex with men (MSM), who face alarmingly high HIV prevalence rates: 26.6% in female SW (Vuylsteke et al., 2012a) and 50% in male SW (Vuylsteke et al., 2012b), and 18% in MSM (Hakim et al., 2015). However, PWUD's health needs are barely known, and very few health organizations are currently working with this population. Our study aimed to collect reliable data on HIV, TB, viral hepatitis, and syphilis among highly vulnerable PWUD in Abidjan.

Methods

We conducted a four-month situational analysis prior to the survey, in collaboration with key informants. The objectives of this preliminary step were to assess major drug use patterns in Abidjan, to map out places of consumption and notably the different "*fumoirs*", and to inform the development of the quantitative questionnaire.

Selection of participants

We used Respondent-Driven-Sampling (RDS) to obtain a representative sample of heroin and/or cocaine users (Heckathorn, 1997; Johnston & Sabin, 2010). People over 18 living in Abidjan, who had used heroin or cocaine at least once during the month prior to the survey, whatever the mode of use, were eligible for inclusion. To participate, PWUD should have received a recruitment coupon from a peer. Each respondent participated only once.

Recruitment started with nine seeds. Two women and seven men were deliberately chosen to reflect the theoretical range of drug users in Abidjan. Two were IDU, two were SW (one woman and one MSM), and three of the seeds were infected with HIV (of which one was not aware of his HIV status before the survey). Seeds were given three coupons to recruit people who met the inclusion criteria from their social network of peers. People recruited were then asked themselves to recruit three people and so on. In compliance with RDS methodology, participants received a primary incentive of 5000 FCFA (8.7 USD) for their participation and a secondary incentive of 3000 FCFA for each peer recruited. The recruitment process continued until the required sample size (at least 450) and equilibrium for the main variables measured (sex, age and proportion of HIV positive) were achieved.

To confirm their eligibility, participants had to undergo an inclusion interview with a peer worker. This process included: checking the validity of the coupon, a test composed of a series of specific questions on drugs and drug use utilizing partly local jargon (e.g. effects and ways of consumption), and recording of biometric measures to avoid multiple participation.

Data collection

The study took place in May 2014 at a central site in Abidjan, in the premises of *La Croix Bleue*, an NGO working in the field of addiction. Except for the nurses, most of the team was composed of PWUD or former PWUD trained for the survey.

Interviewers obtained written, informed consent and conducted a face-to-face interview in French at the study site, using an anonymous, structured, quantitative questionnaire. The following data was collected: social background (age, gender, employment, family, accommodation, and education), drug use (substances, mode and frequency of use), sexual behavior (number of partners, sex work, same sex relationship, and condom use), HIV (general knowledge, previous testing and access to care), history of incarceration, and network of peers. The substances queried in the questionnaire were heroin, cocaine powder, crack cocaine, cannabis, and psychotropic pharmaceutical medicines.

After the interview, a blood sample was collected and a clinical screening for TB was performed by a qualified nurse. In the case of TB symptoms (i.e. according to the national protocol: coughing for at least three weeks OR presence of the four following criteria simultaneously: fever, loss of weight, night sweats for at least three weeks, and contact with a person with active pulmonary TB), two sputa were immediately collected.

Laboratory testing

All samples of intravenous blood were sent to the Center for HIV/AIDS Diagnostics and Research (*Centre de Diagnostic et de Recherche sur le SIDA*) in Abidjan. HIV-1 and 2 screening was conducted using enzyme-linked immunoassay. The presence of HBs antigen and anti-HCV antibody was detected by ELISA. Syphilis screening was performed using VDRL and TPHA plasma-testing. The sputa were sent to the Tuberculosis Center of Adjamé (*Centre Anti-Tuberculeux d'Adjamé*) for Acid-Fast-Bacilli (AFB) smear testing (Ziehl Neelsen coloration) within 48 h.

Variables and statistical analysis

Statistical analysis included the seeds. According to the distribution and the headcount, we used a chi^2 test or a Fisher exact test to compare categorical data, and a Student *t*-test or a Kruskal Wallis test to compare continuous data in univariate analysis.

The crude rate of relevant infections was calculated and then weighted to take account of the RDS method. We studied the factors associated with HIV and TB using generalized linear models (log-binomial regression), results are reported as adjusted odd ratios (aOR). Age and the covariates associated with $p < 0.125$ at univariate analysis were kept for adjustment in multivariate analysis.

For HIV, analysis was performed separately for men and women because of major interactions between the sex and the other covariates. We conducted multivariate analysis for men only, as no variable except the age reached a sufficient *p*-value in women.

Participants who reported at least one sexual relationship within the last 12 months were considered sexually active. Participants who had received money or other benefits for sexual relationships