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Characteristics of high risk HIV-positive IDUs in Vietnam: implications for future interventions

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Abstract

The HIV epidemic in Vietnam is concentrated primarily in injecting drug users (IDUs). To prevent HIV-1 super-infection and to develop effective HIV prevention programs, data are needed to understand the characteristics of high risk HIV-positive IDUs. In 2003, we conducted a community-based cross-sectional study among predominately male, out-of-treatment IDUs, aged 18–45, in Bac Ninh Province, Vietnam. Among 299 male participants, 42.8% were HIV-positive and among those, 96.9% did not know their status prior to the study. Thirty-two percent were HIV-positive and had high HIV behavioral risk (having unprotected sex or having shared injecting equipment in the past 6 months). Injecting for ≥ 3 years, younger age, and pooling money to buy drugs were independently associated with being at high risk for transmitting HIV. IDUs who purchased >1 syringe at a time were less likely to have high HIV behavioral risk. Structural interventions that increase syringe accessibility may be effective in reducing HIV risk behavior among HIV-positive IDUs. Study limitations are noted in the text.

Keywords

HIV-positive; HIV; injection drug users; Vietnam

Introduction

The first case of HIV was diagnosed in Vietnam in 1990 (Ivker, 1996). HIV cases have now been recorded in all 64 provinces and the number of people living with HIV has doubled since 2000, reaching an estimated 263,000 by 2005 (Ministry of Health Viet Nam, 2005; UNAIDS, 2005). Over the past ten years, the HIV epidemic in Vietnam has been concentrated primarily in injecting drug users (IDUs) who account for 65% of reported HIV infections. The second most common route of transmission is through heterosexual contact. Of reported infections in 2006, 9.3% cases were among female sex workers, 4.9% cases were among sexually transmitted disease (STD) patients and 2.2% cases were in pregnant women (Quan, Nguyen, & Go, 2008).

Drug use has been illegal since the early 19th century, when opium first appeared from China (Hammett et al., 2008). Over the past 20 years, Vietnam has been undergoing a rapid transformation. Since the governmental institution in 1986 of *Doi Moi* (open-door economic

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policy), per capita GNP has increased and Vietnam has rapidly positioned itself as a member of the global economic community (Chen & Hiebert, 1994). As a result, Vietnam's population of over 70 million people has faced the prospect of more direct contact with the social and economic forces that have shaped the HIV epidemic in other Asian countries. As Vietnam has experienced the benefits of development, the proportion of the population engaging in drug use has also increased (Nguyen et al., 1999). The number of drug addicts tripled in Vietnam from 55,445 in 1994 (Ministry of Labor Invalids and Social Affairs (MOLISA), 1996) to 170,407 in 2004 (Ministry of Labor Invalids and Social Affairs (MOLISA), 2006), giving an average annual increase of 11.9% (Nguyen & Scannapieco, 2008).

In the 1990s, the HIV epidemic among IDUs in Vietnam has been characterized by multiple explosive increases in HIV infections. Sentinel surveillance data showed dramatic increases in HIV prevalence among IDUs in Quang Ninh (0% in 1996 to 64.9% in 1999) and Hai Phong (0.1% in 1996 to 64.0% in 1999) (Quan, Chung, Long, & Dondero, 2000). After 2000, increases in HIV prevalence among IDUs have continued, but have been less dramatic. Although secondary to injection drug use, HIV infections associated with female sex work continue to increase in major urban and southern areas. The country's highest 2006 HIV prevalence rates among CSWs were in Can tho (33.9%), Hanoi (14.3%), HCMC (11.7%), An Giang (9.5%), Hai Phong (8.4%) (Quan, Nguyen, & Go, 2008).

Through May 2007, 126,543 HIV infections, including 24,788 AIDS cases and 13,847 AIDS-related deaths, have been reported in the country (Ministry of Health, 2007). In this setting, HIV-positive IDUs and their sexual and injecting partners may benefit from specific education messages and other interventions to help reduce HIV risk behavior (Go et al., 2006; Hammett et al., 2005; Tran, Detels, Long, Van, & Lan, 2005).

There are several motivations for reducing HIV risk behaviors among individuals living with HIV/AIDS. In addition to potentially transmitting HIV to others, unprotected sex and shared drug injection among HIV-positive individuals may lead to STDs, other blood-borne infections, including hepatitis B and C virus, and HIV-1 reinfection—all of which can accelerate progression to AIDS (Blackard, Cohen, & Mayer, 2002; Filippini et al., 2001; O'Brien et al., 1999; Wiley et al., 2000). Studies have shown that following notification of their HIV-positive serostatus, most people living with HIV/AIDS make and maintain changes in their sexual and injection drug use practices (Crepaz & Marks, 2002; Kalichman et al., 2001; Rotheram-Borus et al., 2001). However, due to limited access to confidential HIV counseling and testing in Vietnam, few IDUs are aware of their HIV-status (Bergstrom et al., 2007).

To our knowledge, few data are available on HIV-positive IDUs to inform evidenced-based interventions in Vietnam. This study aimed to identify characteristics associated with being an HIV-positive injecting drug user who may not know his status and practices high risk injecting and/or sexual behaviors. The outcomes of this study should be useful to design effective HIV prevention interventions for this vulnerable population.

Methods

As part of a randomized controlled trial of a peer-educator, network oriented HIV preventive intervention, we conducted a cross-sectional survey among out-of-treatment IDUs. We purposively selected Bac Ninh Province, a small, semi-urban province 45 kilometers north of Hanoi, as our project site, based on the Ministry of Health needs, priorities and research objectives. Between August–September 2003, peer recruiters in Bac Ninh province recruited active IDUs. Participants were recruited by trained individuals who were purposively

selected to match participants in age, gender, ethnicity, education and drug using experience, in order to facilitate rapport-building. Specifically, recruiters ranged in age from 15–45, were of Kinh ethnicity, completed an average of 8 years of school and were predominately males who were former and or current drug users. The recruitment script included a brief introduction about the purpose of the study, study procedures, the voluntary nature of participation, and an explanation of how data would be used.

The social milieu of this study population has been evaluated using ethnographic methods and has been previously described (Go, Quan, Voytek, Celentano, & Nam, V, 2006). In brief, most informants were laborers, farmers, vendors, small business owners or *xe om* drivers (motorcycle taxi drivers). Our previous research shows the broad impact that drug use has on the lives of IDUs and their immediate networks. Most IDUs reported that their day was spent using drugs and trying to earn money to support their next injection, while sex partners of IDUs often carried the dual burden of earning money and caring for the family. IDUs and their sexual partners frequently described their lives as physically and emotionally difficult.

Of 393 eligible community-based IDUs approached by outreach workers, 313 (79.6) participated. Of these, four (1.3%) declined the blood draw after pretest counseling. Data were collected in three private rooms that were part of the district health station in two districts, Bac Ninh town center and Tu Son, a rural district 10 kilometers from the town centers. Individuals eligible for the study were at least 18 years of age, reported having injected drugs in the six months prior to the survey, and provided voluntary informed consent. Participants who completed the survey were compensated VND 45,000 (equivalent of US \$3 or 10 kilograms of rice in Vietnam) for their time. The research protocol and consent forms were reviewed and approved by the National AIDS Standing Bureau's institutional review board and the Johns Hopkins Bloomberg School of Public Health's Committee on Human Research.

Participants completed a 30-minute face-to-face interview by a trained interviewer in a private room at the project site. After participants were given HIV pre-test counseling, laboratory personnel obtained blood and urine specimens. Specimens were transported to a lab facility in Hanoi.

HIV testing was performed on serum using HIV ELISA 1.2.0 (Abbott Murex Biotech Limited, Kent, England), repeated using Genscreen HIV 1/2 Version 2 ELISA (BioRad, Marnes-la-Coquette, France) and confirmed using Western blot (BioRad, Marnes-la-Coquette, France). One week after testing, participants were provided HIV post-test counseling and test results. Participants were provided STD treatment on site as needed or were referred to healthcare facilities in Bac Ninh province.

The primary outcome was an index of being a high risk IDU which we defined as “being HIV-positive” and “having unprotected sex in the past 12 months” or “having shared injecting equipment in the past 6 months.”

We examined variables that were hypothesized to be associated with being a high risk HIV-positive IDU based on prior studies. Variables associated marginally ($p < .10$ in univariate analysis) with the above risk index were modeled with multiple logistic regression to identify characteristics independently associated with high HIV risk behavior. To avoid over-fitting, we selected a model using forward stepwise regression, where at each step, the order of a variable being included in the model is determined by the relative improvement in the model fit if that versus if other variables are included.

Results

Table 1 describes the socio-demographic and behavioral characteristics of IDUs in Bac Ninh, Vietnam. Of 393 community-based IDUs approached by outreach workers, 309 (78.6%) eligible participants completed an interview and provided specimens; females (n = 11) were excluded from all analyses due to the small number. Among 299 male participants, 128 (42.8%) were HIV-positive and among those, 124 (96.9%) did not know their sero-status prior to participating in the study. Ninety-six (32.4%) were both HIV-positive and had a high HIV behavioral risk profile. The median age was 27 (23–32) and most participants were single (61.2%). Approximately 40% had injected less than three years and half injected drugs daily.

Table 2 shows the odds ratios for characteristics associated with a high behavioral HIV risk profile in univariate and multivariate analyses. Variables that remained statistically significant after multivariate adjustment were injecting duration of three or more years, and pooling money with others to buy drugs to inject. Younger age remains statistically significant for the 27–31 and 23–26 year old age groups and is marginally significant for the youngest age group (<23 years old). Men who purchase more two or more syringes and needles at one time were less likely to be HIV-positive and practice high risk behaviors. No interaction terms were found to be statistically significant.

Discussion

Similar to sero-surveillance reports and other recently conducted studies in Vietnam (Hammett et al., 2005; Nguyen, Hoang, Pham, & Detels, 2001; Tran, Detels, Long, Van, & Lan, 2005; Quan, Nguyen, & Go, 2008), the prevalence of HIV is high among IDUs in our study. The vast majority was unaware of his sero-status and one third of our participants had a high HIV behavioral risk profile that places them or their injecting or sexual partners at high risk for HIV infection. The high proportion of males in our study (96.4%) corroborates government reports. In 2001, 96.2% of drug users in Vietnam were male (Ministry of Labor Invalids and Social Affairs (MOLISA), 2001) and in Bac Ninh specifically, 98.6% of IDUs were male.

The main correlates of having a high HIV risk profile in this population were injecting behaviors. Duration of injection was associated with increased risk of transmitting HIV, reflecting an accumulation of injecting partners and increased potential for exposure to HIV. Controlling for duration of injection, IDUs who were 23–26 and 27–31 years of age versus those who were over 31 years and those who pooled money with others to buy drugs were more likely to have a high HIV risk profile. Studies have shown that IDUs in Vietnam today are much younger than those in the past (Thao le, Lindan, Brickley, & Giang, 2006), with a mean age of less than 25 years (Nguyen, Nguyen, & Trinh, 2004; Nguyen, Hoang, Pham, & Detels, 2001). They tend to be more drug-dependent and more likely to share injecting equipment (Nguyen, Nguyen, & Trinh, 2004). In addition, individuals who pool money to buy drugs are social injectors who tend to inject with friends. A study conducted in five cities in the US among young injectors, found higher rates of injection risk behavior among IDUs who reported injecting with others. Injecting with others may facilitate riskier injection practices through negative peer pressure and reduced control over one's injection setting (Hagan et al., 2007).

Buying two or more needles and syringes at one time was associated with being at high risk for HIV transmission. Those who buy more than one needle and syringe are more likely to have new ones readily available at the time of injection. However, in Vietnam, many IDUs are afraid to carry needles and syringes because they will be stopped by police, who may use

this possession as evidence of drug use (Nguyen, Nguyen, & Trinh, 2004). Our findings highlight the importance of finding ways to make needles and syringes easily accessible.

In order to validate our statistical model we compared it to one that only attempts to predict HIV. As expected, we found the models were different. Similar to the “high risk” model, factors associated with HIV in multivariate analysis included being 23–26 (OR: 3.95; 95% CI: 0.89, 4.50) and 27–31 (OR: 2.83; 95% CI: 1.40, 5.73) years of age versus over 31 years, injecting for more than three years (OR: 3.80; 95% CI: 2.13, 6.77), and purchasing two or more syringes and needles at one time (OR: 0.39; 95% CI: 0.21, 0.75). However, in the HIV model, pooling money to buy drugs was no longer significant and HIV risk perception (OR: 2.51; 95% CI: 1.39, 4.54) was significant. The differences in the models may be due to the different roles that recent versus cumulative exposure plays in the two outcomes. Specifically, the probability of HIV infection depends on cumulative injecting and sexual behavior whereas the probability of being a “high risk” IDU, depends on both cumulative and recent behaviors. IDUs who accurately perceive themselves at risk for HIV may be aware of past risky behaviors; however, these same individuals may not currently be practicing high risk behaviors. Similarly, some HIV-positive IDUs who may have practiced HIV risk behaviors in the past may not currently inject socially; a practice that is associated with higher risk behaviors. Therefore, using our “high risk” index as an outcome better defines “high-risk HIV positive IDUs” than using “HIV status” alone.

There are a number of important limitations that need to be considered in drawing conclusions from this study. First, because all behavioral data relied on self-report, associations of high risk behavior and disease may be underestimated across risk behaviors. When answering questions about sensitive behaviors, participants may have given what they perceived to be socially desirable responses. While differential misclassification of the exposure (risk characteristics) may have occurred, it is expected that this bias would dilute the estimates of association between risk characteristics and having a high behavioral HIV risk profile and thereby result in conservative estimates.

Second, data on exposures and outcome were collected concurrently, and, as mentioned above, the accuracy of reported past exposures is limited. Although longitudinal studies are needed to establish temporality and may aid researchers to draw causal associations, cross-sectional studies can still contribute to the knowledge about high probability transmitters by describing links and associations to be further explored in cohort studies.

Third, the data used for these models were collected simultaneously with people being tested for HIV, thus one cannot predict that participants’ risk behaviors prior to receiving their results would necessarily persist afterwards (Des Jarlais et al., 2004). However, in Vietnam, where access to VCT among IDU is poor, the vast majority of HIV-positive IDUs do not know their status (Bergstrom et al., 2007). Prior to getting tested in our study, only 3% of HIV-positive participants knew their sero-status.

While the strength of this quantitative study is in its relatively large sample size, it does not provide an in-depth qualitative description of the participants. A more detailed description of the participants and their social environment is provided elsewhere based on the formative phase of the study (Go, Quan, Voytek, Celentano, & Nam, V, 2006). Although our sample was not randomly selected, previous studies have indicated that recruitment of hidden populations through snowball sampling using peer outreach workers has been successful in obtaining a broad sampling of the population (Griffiths, Gossop, Powis, & Strang, 1993; Powis et al., 1999). Nonetheless, results from this study may only represent STD prevalence and sexual risks among male IDUs in the two districts of Bac Ninh or in other areas in Vietnam where socioeconomic characteristics and drug using practices are similar.

Based on our findings, we recommend a three-prong approach to protect HIV-positive IDUs from HIV superinfection and other infections and to protect their needle-sharing and sex partners from HIV transmission: 1) early intervention through prevention of drug use in adolescents; 2) increased access to needles and syringes to prevent HIV among those who already use drugs; and 3) increased access to confidential HIV VCT to increase care for HIV positive individuals and facilitate prevention for positives.

This study and many others point to the need to address the growing population of young drug users and their partners in Vietnam who are most vulnerable to the HIV epidemic (Thao le, Lindan, Brickley, & Giang, 2006; Le, Nguyen, Le Thuy, & Narimani, 1999; Nguyen, Nguyen, & Trinh, 2004). Almost half of the participants in our study were less than 27 years of age, and one quarter had started using drugs before they were 19. Innovative, interactive programs that extend beyond didactic sessions are urgently needed to prevent initiation of injecting drugs among adolescents and to facilitate safer injecting practices among young injectors. Conducting outreach at entertainment sites where young people smoke and exchange drugs may be an effective strategy for reaching this population. While our sample size was not able to directly assess biological outcomes related to transmission, this subgroup may be at higher risk of viral transmission to their injecting or sexual partners.

The small percentage of our study population who knew their HIV status is of concern. It is well documented that HIV counseling and testing can effectively reduce HIV risk behaviors (2000). Over the next five years, HIV counseling and testing will be scaled-up in Vietnam through the President's Emergency Plan for AIDS Relief (PEPFAR), a \$15 billion global initiative to combat the HIV/AIDS epidemic in 15 focus nations (White House, 2003). Efforts to ensure accessibility of confidential counseling and testing to hard-to-reach, highly stigmatized populations, including IDU and sex workers are critical and could include the use of mobile testing venues.

In our study, lack of access to needles and syringes was associated with HIV risk behavior and supports the well documented effectiveness of needle syringe programs (NSP) (Coyle, Needle, & Normand, 1998) in reducing HIV risk behaviors. Currently, NSPs are not available in Bac Ninh Province. Since NSPs were first introduced in Vietnam a decade ago, NGOs have implemented small programs distributing needles to IDUs through peer educators in 28 of 61 provinces in Vietnam. These pilots suggest that NSP may be both feasible and acceptable in this setting (Quan, Chung, & Abdul-Quader, 1998; Walsh, Gibbie, & Higgs, 2008). Our findings underscore the importance of scaling up NSP as part of a larger HIV prevention strategy.

Implementation of these three recommendations would require strong government and community support. HIV-related stigma has been widely reported in Vietnam and stems from a history of HIV policies and programs and the deeper cultural context of "social evils." National policies and programs have strongly linked HIV/AIDS with illegal drug use and prostitution—both of which fall under the general rubric of "social evils." The government's discourse on "social evils" (e.g., drugs, prostitution) began in the post-American war era as a response to the socialist transformation of the South and the government's anxieties of the social effects of market reform and the rise of consumerism in Vietnam (Luong, 2006). In 2000, Vietnam merged its National AIDS Committee with the Department for Social Evil Prevention; combining these two social issues under one program umbrella firmly established the link between HIV and social evils in the public eye (Hong, Anh, & Ogden, 2004; UN Country Team, 2004). Using drugs and prostitution are strongly condemned in Vietnam because they are seen as threatening the stability of families: drug use is blamed for damaging family finances and sex work is responsible for "breaking a family's happiness" by causing men to be unfaithful to their wives (Hong, Anh,

& Ogden, 2004). The family is the center of Vietnamese society; building and protecting one's family are among each person's most important responsibilities. Therefore, drug users and sex workers have been stigmatized well before the presence of HIV in Vietnam.

The Vietnamese government recently endorsed harm reduction principles in the National Strategy for HIV Prevention in 2004 and the National HIV/AIDS Law in 2006.¹ While these policies are an important step towards an effective HIV prevention strategy, HIV and IDU-related stigma remains entrenched in communities and may hinder progress of HIV interventions. Therefore, before initiating harm reduction programs, a number of steps must be taken in order to gain community support. Community based programs that can: 1) reduce HIV-related stigma by de-linking HIV from moral judgments; 2) reduce misconceptions about transmission; and 3) change perceptions of people living with HIV/AIDS, are critical to creating a community environment that is conducive to behavior change among HIV-positive IDU.

Glossary

Cross-Sectional Survey	A study that observes characteristics of a subset of a population at a particular point in time
<i>Sentinel Surveillance</i>	Monitoring of disease trends in certain cohorts, geographic areas and/or subsets of a population, and is used when population-based surveillance is unfeasible, such as when the disease is rare, or is mostly concentrated among certain subsets of a population
<i>Snowball Sampling</i>	A technique for recruiting study subjects where existing subjects recruit future subjects from among their acquaintances. This technique is often used to recruit samples of hidden populations, such as drug users or commercial sex workers
<i>Voluntary Counseling and Testing (VCT)</i>	A strategy of counseling used for HIV prevention and care at the time in which an HIV test is requested. Counseling is focused on what the test results means, information about HIV/AIDS and behavior change, with one counseling session typically occurring prior to taking the test and the second occurring once test results are received

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¹In 2004, the Prime Minister approved the National Strategy for AIDS Prevention and Control, which included scaling up harm reduction programs, expanding HIV counseling, care and treatment, and reducing stigma and discrimination against people with HIV and AIDS (National Committee for AIDS, Drug and Prostitution Prevention and Control, 2004). In 2006, the National Assembly passed the Law on HIV/AIDS Prevention and Control, which legalizes harm reduction measures, including condom promotion, access to sterile injection equipment and substitution treatment for opiate dependence (The XIth National Assembly of the Socialist Republic of Vietnam, 2006).

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Table 1

Characteristics of male IDU study participants, Vietnam pre-baseline

Characteristic	Total N	%
Overall	299	100.0
HIV risk profile		
High risk:	97	32.4
HIV positive & Shared inj equip only	52	17.4
HIV positive & Unprotected sex only	14	4.7
HIV positive & Shared & Unprotected sex	31	10.4
Not high risk	202	67.6
HIV status		
Negative	171	57.2
Positive	128	42.8
Shared any injection equipment, last 6 months		
No	114	38.1
Yes	185	61.9
Any unprotected sex, last 12 months		
No	158	52.8
Yes	141	47.2
Age: Median (IQR)		
		27 (23–32)
< 23 years old	60	20.1
23–26	74	24.7
27–31	81	27.1
32+	84	28.1
Years of education: Median (IQR)		
		8 (6–11)
0–5 years	63	21.1
6–8	105	35.1
9–11	66	22.1
12+	65	21.7
Marital status		
Ever married	116	38.8
Never married	183	61.2
Employment status		
Employed	207	69.2
Unemployed/Other	92	30.8
Where did you live most of the time, in last 6 months?		
Parents' house or apartment	197	65.9
Own/Other's house or apartment	93	31.1
Other (not house or apartment)	9	3.0
Age at first injection: Median (IQR)		
		23 (19–27)
< 23 years old	138	46.1
23–26	79	26.4

Characteristic	Total N	%
27–31	45	15.1
32+	37	12.4
Size of social network: Median (IQR)		2 (1–4)
Duration of injection: Median (IQR)		3 (2–6)
Less than 3 years	119	39.8
3+ years	180	60.2
Frequency of injection, last 6 months		
< Daily injection	146	48.8
Daily injection	153	51.2
Have you ever been in drug treatment?		
No	147	49.2
Yes	152	50.8
Have you ever overdosed on any drugs?		
No	169	56.5
Yes	130	43.5
Had sex with a female sex worker, FSW, last 12 months		
No	189	63.2
Yes	110	36.8
Knowledge of HIV status: Prior HIV testing and receiving test results		
No prior HIV testing	188	62.9
Tested for HIV, did not get result	62	20.7
Tested for HIV and received result	49	16.4
Do you think you are at risk for HIV?		
Yes	110	36.8
No	131	43.8
Don't Know	58	19.4

Table 2

Multivariate of factors associated with a high HIV behavioral risk profile (i.e., being HIV-positive AND sharing any injection equipment in the last 6 months and/or having unprotected sex in the last 12 months), among male IDU study participants (N=299)

Characteristic	Total N	High risk HIV transmission N	%	Bivariate OR (95% CI)	Multivariate	
					OR	(95% CI)
Age						
< 23 years old	60	16	26.7	2.18 (0.94, 5.04)	2.54	(0.99, 6.52)
23–26	74	35	47.3	5.38 (2.51, 11.54)	4.66	(2.03, 10.72)
27–31	81	34	42.0	4.34 (2.04, 9.22)	3.64	(1.62, 8.19)
32+	84	12	14.3	1.0	1.0	
Duration of injection						
Less than 3 years	119	20	16.8	1.0	1.0	
3+ years	180	77	42.8	3.70 (2.11, 6.50)	4.51	(2.39, 8.50)
Did you put money together with others to buy drugs to inject, last 6 months?						
No	120	21	17.5	1.0	1.0	
Yes	179	76	42.5	3.48 (1.99, 6.07)	3.70	(1.99, 6.90)
Number of new, sterile syringe & needle you usually get at a time, last 6 months						
1 new syringe & needle	220	83	37.7	1.0	1.0	
2+	79	14	17.7	0.36 (0.19, 0.67)	0.46	(0.23, 0.95)