

HIV Risk Behaviours and Determinants Among People Living with HIV/AIDS in Vietnam

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Abstract There is a potentially high risk of HIV spreading from people living with HIV/AIDS. We conducted a cross-sectional study to examine HIV risk behaviours and their determinants among people living with HIV/AIDS. Eighty-two percent had been sexually active. Sex with multiple partners was reported by 20% and consistent condom use by about one third. More than half of the participants (52%) reported having injected drugs during the previous month, and 35% of those had shared needles and syringes. Voluntary HIV testing and having received condoms or injection equipment from the local HIV prevention program, were found to be significantly associated with fewer HIV risk behaviours. Having learned recently about personal HIV status, multiple sex partners, low educational attainment and young age were found to be associated with higher HIV risk behaviours. Giving high priority to targeted preventive and support programmes is likely to be a highly cost-effective strategy.

Keywords Risk behaviours · HIV/AIDS ·
People living with HIV/AIDS · Vietnam

Introduction

The increasing proportions of HIV infected people being aware of their status offer a great prevention opportunity. However, many of these opportunities seem to have been missed. Indications of this are seen in findings from different parts of the world showing high levels of risk taking among people living with HIV/AIDS (PLWHA, i.e. being aware of own status) such as multiple sexual partners, unprotected sexual intercourse and sharing of needles and syringes, and the determinants of these behaviours (Amirkhanian et al. 2003; Browning et al. 2003; Kalichman et al. 1997; Kalichman 1999, 2000; Kiene et al. 2006).

Behavioural interventions among HIV-positive individuals have been shown to be successful in reducing the risk of HIV transmission. Many studies have been conducted to evaluate preventive interventions aimed at reducing sexual risk and sharing of needles and syringes among PLWHA. A meta-analytic review of 12 controlled trials among multiple groups of PLWHA showed that such interventions were highly effective in reducing unprotected sex and sexually transmitted infections (STIs) among PLWHA, but effects of interventions on needle sharing were non-significant (Crepaz et al. 2006). A recent review of behavioural interventions for HIV-positive drug users found that these interventions were effective in reducing drug-related harm (Strathdee and Patterson 2006).

Research on risk behaviours among PLWHA has been limited in Vietnam where serious HIV epidemic has developed over the past 10–15 years among injecting drug users (IDUs) and female sex workers (FSWs) (Gorbach et al. 2002; Nguyen et al. 2004b; Tuan et al. 2007). Findings based on data from the national HIV sentinel surveillance system (NIHE 1994–2006) and those based on particular surveys conducted in different population groups

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in selected provinces (Tuan et al. 2007) have been consistently showing marked geographical variation in HIV prevalence among both IDUs and FSWs. An HIV survey in four provinces revealed the variation in prevalence by province to be 4–36% among IDUs and 0–24% among FSWs (Tuan et al. 2007). In groups surveyed in the general population such as antenatal clinic attendees and military recruits the prevalence has been low and below 1% (NIHE 1994–2006).

Most past HIV prevention efforts in Vietnam have focused on “how HIV-negative people can stay negative”. The Ministry of Health has realised that the increasing number of PLWHA needs to be targeted for effective prevention (MOH 2007), and in this regard there is an urgent need for better understanding of risk-taking behaviours among HIV infected in order to design effective programmes. The aim of this paper is to examine the magnitude and determinants of HIV risk behaviours among PLWHA in Vietnam.

Methods

Study Population and Sampling Methods

A survey was carried out among PLWHA from 20 project provinces: Cao Bang, Lang Son, Thai Nguyen, Ha Noi, Hai Duong, Hai Phong, Quang Ninh, Phu Tho, Nam Dinh, Nghe An, Thanh Hoa, Khanh Hoa, Dak Lak, Ho Chi Minh city, Tay Ninh, Can Tho, Soc Trang, An Giang, Kien Giang and Ca Mau. In Vietnam, most HIV tests are conducted in the public health system and only a few in private health facilities. All HIV reactive samples must be sent to either provincial HIV confirmatory laboratories or regional reference laboratories for confirmation, and this is forming the basis for identifying and registering all HIV-positive persons. During the early years of the HIV/AIDS epidemic, Vietnam promoted a program called QTC (Quan ly-Tu van-Cham soc, or Management, Counselling, and Care), whose aim was to provide post-test counselling and care services to people infected by HIV. Information about HIV-positive people would be sent through the vertical health care system, from the provincial level to the district and then to the commune health centre. A local health care worker in charge of the HIV program at commune health centres would then visit each person at home to provide counselling. The test results were to be kept confidential and shared only with participating health care professionals and the HIV infected person.

Participants in this survey were selected by systematic random sampling from the lists of HIV-positive individuals who had been informed about their HIV status and been counselled. Those eligible were 15 years of age or older,

residents of the study area, and not to be in a critical health condition or otherwise unable to communicate. The local health care workers in charge of the HIV program at commune health centres then made a contact to invite them to participate in the study. Selected persons not found were substituted by selecting the next eligible person on the list.

Data Collection

Data were collected June to September of 2004 by trained field teams from the provincial centres for preventive medicine, and these were supervised by a national advisory team from the National Institute of Hygiene and Epidemiology. Using a specially designed questionnaire, the teams collected information on socioeconomic and demographic characteristics; history of HIV counselling and testing; clinical symptoms and treatment; drug use and sexual behaviours; and support from family and community. The participants were interviewed in their homes or at the health clinic.

Data Analysis

Initially, descriptive analyses were performed. To measure sexual risk behaviours, we identified four different groups of sexual partners: regular partners, female sex workers (FSWs), other non-regular partners, and clients. Regular partners were spouse and long-term boyfriend or girlfriend. FSWs were defined as persons who earn money by providing sexual services. Other non-regular partners were defined as one-time sexual partners (one-night stands) whom they did not know beforehand. Clients were defined as those who exchange money for sexual services with FSWs.

We performed univariate logistic regression analyses to derive crude estimates of association between predictors and outcomes. The outcome variables were consistent condom use with sexual partners and needle- and syringe-sharing with drug use partners. Consistent condom use was defined as using condoms in all sexual relationships during the previous 12 months. Needle and syringe-sharing behaviours were defined as either borrowing needles and syringes from drug user partners or handing to them during the last 12 months.

Multivariate logistic regression was used to examine the associations of independent variables with the outcome, simultaneously adjusting for potential confounders. The adjusted odd ratios (ORs) and 95% confidence intervals (CI) were calculated to estimate and measure the association. Variables were selected for the multivariate model on the basis of prior knowledge about the relationship between them and the outcome, the magnitude of the odd ratios in univariate analysis, and specific research interests.

Variables included in the logistic regression analyses were: sex, age-group (15–24, 25–29, 30–39, and ≥ 40), educational attainment (primary school and lower, secondary school, and high school and above), current marital status (unmarried vs. married), time since HIV status known (1 year, 2–4 years, and ≥ 5 years), mandatory HIV testing versus voluntary HIV testing, history of drug injection (no vs. yes), multiple sex partners measured as number of sex partners during the previous 12 months (no vs. yes), having received condoms, needles and syringes from the local HIV prevention program (no vs. yes). We hypothesized that education attainment, time since HIV status known, mandatory HIV testing, multiple sex partners, and having received condoms, needles and syringes from the local HIV prevention programs are associated with consistent condom use and needle and syringe sharing behaviours.

Stratified analysis was performed to examine the effect of each independent variable with outcome by gender in order to determine whether gender could be an effect modifier.

Ethical Issues

The survey was conducted on the basis of informed oral consent by each participant, and participation was anonymous. No names or other identifying information was collected. All information provided by participants was kept confidential.

Results

General Characteristics of Participants

Of the 4,266 participants, 83.3% were males and 16.7% were females. The majority (79.3%) was 20–34 years old and the mean age was 29.0 years (SD, 6.8 years). Most had completed secondary school (49.4%) or higher (25.5%). About 4% had no schooling and 20% had only completed primary school. The Kinh ethnic groups (Vietnamese) accounted for most of the respondents (90.1%). This is the majority ethnic group in Vietnam, constituting 87% of the total population according to the 2003 national census. More than half of the respondents were single (54.2%). A minority was homeless (2.3%) or lived alone (4.2%). Almost half (47.3%) were unemployed.

Sexual Behaviours and Condom Use Practices

Eighty-two percent of the participants had been sexually active at least once, 79.2% for males and 97.6% for females, and 55% had been sexually active during the previous 12 months, 53.2% for males and 65.8% for

females. Sex with multiple partners was reported by 20% and sex with regular partners by 43%, both during the past year. The proportion of men buying sex from FSWs during the past year was 18% (Table 1).

Consistent condom use, measured as always used during the past 12 months, was relatively low with all types of partners (Table 1). Of those who were sexually active during the previous 12 months, consistent condom use was reported by 41.3% among males and by 26.6% among females with regular partners; 35.1% among males with FSWs; 30.1% among males and 23.1% among females with other non-regular partners; and 41.1% among FSWs with their clients. The proportions reported use of condoms during the most recent sexual intercourse was substantially higher than the proportions reported consistent condom use (Table 1).

Table 1 Sexual behaviours among HIV-infected men and women

Characteristics	Men		Women	
	N = 3,552		N = 714	
	No	%	No	%
<i>Ever sexually active</i>				
No	739	20.8	17	2.4
Yes	2,807	79.2	693	97.6
<i>Sexually active during past 12 months</i>				
No	1,661	46.8	244	34.2
Yes	1,891	53.2	470	65.8
<i>Number of sex partners during last 12 months</i>				
0	1,661	46.8	244	34.2
1	1,177	33.1	309	43.3
≥ 2	714	20.1	160	22.4
<i>Type of partner during last 12 months</i>				
Regular partners	1,447	40.7	403	56.4
Female sex workers	644	18.1	–	–
Other non-regular partners	156	4.4	26	3.6
Clients	–	–	101	14.1
<i>Condom use with type of partner during last 12 months^{a,b}</i>				
Consistent condom use with type of partner during last 12 months				
Regular partners	597	41.3	107	26.6
Female sex workers	226	35.1	–	–
Other non-regular partners	47	30.1	6	23.1
Clients	–	–	42	41.6
Condom use with type of partner at last sexual intercourse				
Regular partners	903	62.4	192	47.6
Female sex workers	422	65.5	–	–
Other non-regular partners	83	53.2	11	42.3
Clients	–	–	71	70.3

Totals may not add up to 100% for some variables because of missing values

^a Denominator: Sexually active during last 12 month

^b More than one type of partner may be reported by each participant

Among those who did not use condom during the most recent sexual intercourse, “dislike” (about 50%) was the most commonly cited reason (results not shown). Among the other main reasons were “condom not necessary” (about 25%), “don’t care about condoms” (about 19%) and “condoms not available” (20.3% with regular partners, 25.7% with FSWs and 32.8% with other non-regular partners). Among female participants, partner objection (21.7%) was the other main reason for not using a condom during the most recent sexual intercourse.

Drug Use Behaviours

Almost 87% of males and 23% of females reported having used drugs, and 86% of males and 21% of females reported having injected drugs (Table 2). More than half the participants (51.6%) had injected drugs during the past month, and 35% of those had shared needles and syringes. Sixteen percent had borrowed used needles and syringes from someone during the last month to inject drugs (18.9% for males and 4.5% for females). Moreover, 14% had handed used needles and syringes to someone during recent months (16.4% for males and 4.5% for females).

Table 2 Drug use behaviours among HIV infected males and females

Characteristics	Males		Females	
	N = 3,552		N = 714	
	No	%	No	%
<i>Ever used drugs</i>				
No	469	13.2	547	77.5
Yes	3,080	86.8	159	22.5
<i>Ever injected drugs</i>				
No	515	14.5	564	79.0
Yes	3,037	85.5	150	21.0
<i>Frequency of IDU during last month</i>				
≥2 times a day	766	21.6	38	5.3
1 time a day	708	19.9	21	2.9
2–6 times a week	329	9.3	10	1.4
1 time a week	130	3.7	1	0.1
1–3 times a month	195	5.5	5	0.7
No drug injecting last month	1,424	40.1	639	89.5
<i>Borrowed used needles and syringes from someone during last month</i>				
No	2,879	81.1	682	95.5
Yes	673	18.9	32	4.5
<i>Lent used needles and syringes to someone during last month</i>				
No	2,982	83.9	682	95.5
Yes	570	16.4	32	4.5

Totals may not add up to 100% for some variables because of missing values

Determinants of Consistent Condom Use

Multivariate logistic regression analyses showed that having received voluntary HIV testing and having received condoms from the local intervention program during the past 6 months were significantly associated with consistent condom use (protected sex) with regular partners (Table 3), FSWs (Table 4), and other non-regular partners (data not shown).

Having learned one’s own HIV status more than 5 years and not having had sex with multiple partners during the last 12 months were significantly associated with consistent condom use with regular partners (Table 3) and with FSWs (Table 4).

In addition, high education attainment was found to be significantly associated with consistent condom use with regular partners (OR = 1.5, 95% CI 1.20–1.98 for secondary school, and OR = 2.3, 95% CI 1.69–3.09 for high school and higher).

Determinants of Needle and Syringe Sharing

In multivariate logistic regression, having received mandatory HIV testing (OR = 1.2, 95% CI 1.01–1.49), not having received needles and syringes from the local intervention programs during the previous 6 months (OR = 2.7, 95% CI 2.04–3.53), multiple sex partners (OR = 1.8, 95% CI 1.47–2.28), low education attainment (OR = 1.4, 95% CI 1.05–1.87 for primary school and less and OR = 1.3, 95% CI 1.00–1.66 for secondary school), and younger ages (OR = 2.2, 95% CI 1.41–3.34 for 15–24 years old, OR = 2.1, 95% CI 1.59–2.68 for 25–29 years old, and OR = 2.1, 95% CI 1.65–2.69 for 30–39 years old), were found to be associated with sharing of needles and syringes (Table 5).

Discussion

The findings suggest that the risk of HIV transmission from PLWHA to the general population is high in Vietnam. Widespread IDU and frequent sharing of injection equipment in this group is an important means of transmission. Most participants had injected drugs (84%), more than half (52%) had injected drugs during the previous month, and 35% of those reported sharing needles and syringes. A second important route of transmission was heterosexual exposure through frequent sexual mixing and sex work combined with low consistency of condom use. A significant proportion (20%) reported sex with multiple partners, and 18% of the men reported sex with FSWs during the last year, while less than 40% reported using condoms consistently. “Dislike using condom” and “condom not

Table 3 Logistic regression analysis of factors for consistent condom with regular partners during the last 12 months among HIV-infected males and females

Factors	N	Prevalence	Unadjusted ORs	95% CI UORs	Adjusted ORs	95% CI AORs
<i>Sex</i>						
Females	392	27.3	1	–	1	–
Males	1,419	42.0	1.9**	1.51–2.47	1.5*	1.10–2.08
<i>Age</i>						
15–24	358	29.6	1	–	1	–
25–29	601	37.9	1.2	0.86–1.66	1.1	0.79–1.62
30–39	668	42.7	1.4*	1.04–2.02	1.3	0.88–1.86
≥40	185	47.0	2.1**	1.46–3.05	1.2	0.76–1.80
<i>Educational attainment</i>						
Primary school and less	467	28.3	1	–	1	–
Secondary school	909	38.4	1.7**	1.34–2.13	1.5**	1.20–1.98
High school and higher	442	51.1	2.7**	2.03–3.51	2.3**	1.69–3.09
<i>Currently marital status</i>						
Not married	580	31.2	1	–	1	–
Married	1,239	42.5	1.6**	1.32–2.00	1.4**	1.11–1.87
<i>Time since HIV status known (in years)</i>						
1	700	30.9	1	–	1	–
2–4	347	38.3	1.7**	1.34–2.27	1.4*	1.04–1.86
≥5	324	56.2	2.8**	2.12–3.69	2.4**	1.74–3.22
<i>HIV testing was</i>						
Mandatory	862	33.6	1	–	1	–
Voluntary	943	43.7	1.5**	1.26–1.85	1.5**	1.22–1.86
<i>Ever Injected drugs</i>						
No	624	31.3	1	–	1	–
Yes	1,196	42.9	1.7**	1.35–2.03	1.3*	1.01–1.73
<i>Number of sex partners during last 12 months ≥2</i>						
Yes	478	30.3	1	–	1	–
No	1,341	42.0	1.7**	1.33–2.08	1.6**	1.22–2.06
<i>Received condoms during last 6 months</i>						
No	1,111	31.1	1	–	1	–
Yes	696	51.3	2.3**	1.92–2.84	2.3**	1.83–2.80

OR, odds ratio; UOR, unadjusted odds ratio; AOR, adjusted odd ratio; CI, confidence interval

* $P < 0.05$; ** $P < 0.01$

available” were among major reasons for not using condoms. Indications of having access to preventive programmes, e.g. voluntary HIV testing and having received condoms, needles and syringes from the local HIV prevention programme, were found to be significantly associated with consistent condom use and less sharing of injection equipment. Multiple sex and low education attainment were significantly associated with both sharing of injection equipment and lower consistent use of condoms with regular partners. Moreover, younger age was found to be significantly associated with sharing of injection equipment.

The high proportion of IDUs among the participants in this survey accords with previous studies that HIV-infected people in Vietnam are predominantly IDUs (Nguyen et al.

2001; Nguyen et al. 2004a, b; NIHE 1994–2006; Tran et al. 2005; Tran et al. 2006a). Also, the high proportion who reported sharing injection equipment accords with previous findings from Vietnam (Godwin et al. 2005; Nguyen et al. 2001; Tran et al. 2006a). A high risk of HIV transmission from PLWHA to others through sharing needles and syringes has been found previously in many countries. A study from Street Outreach in Miami has showed that one third of HIV-positive injectors did not apply safe injection practices (Metsch et al. 1998). Another study among persons with HIV in Russia reported that most IDUs still shares needle with drug user partners after being told their HIV status (Amirkhanian et al. 2003). A meta-analytic review of controlled trials showed that the reduction of needle sharing was relatively large but the estimated

Table 4 Logistic regression analysis of factors for consistent condom with female sex workers during the last 12 months among HIV-infected men

Factors	N	Prevalence	Unadjusted ORs	95% CI UORs	Adjusted ORs	95% CI AORs
<i>Age</i>						
15–24	166	36.1	1	–	1	–
25–29	258	38.0	1.4	0.70–2.94	1.6	0.75–3.47
30–39	163	31.3	1.1	0.54–2.09	1.4	0.66–2.91
≥40	40	40.0	1.1	0.57–2.33	1.3	0.58–2.82
<i>Educational attainment</i>						
Primary school and less	137	36.5	1	–	1	–
Secondary school	324	33.0	1.5	0.98–2.14	1.3	0.84–1.91
High school and higher	165	41.2	1.2	0.77–1.97	1.0	0.61–1.69
<i>Currently marital status</i>						
Married	103	23.3	1	–	1	–
Not married	524	38.4	2.0**	1.25–3.33	1.9*	1.11–3.25
<i>Time since HIV status known (in years)</i>						
1	210	26.7	1	–	1	–
2–4	296	38.9	1.3	0.81–1.95	1.2	0.77–1.96
≥5	113	45.1	2.2**	1.37–3.59	2.3**	1.34–3.79
<i>HIV testing was</i>						
Mandatory	404	31.3	1	–	1	–
Voluntary	323	40.2	1.5*	1.07–2.06	1.5*	1.04–2.09
<i>Ever Injected drugs</i>						
No	123	32.5	1	–	1	–
Yes	504	36.7	1.2	0.79–1.83	1.1	0.66–1.67
<i>Number of sex partners during last 12 months ≥2</i>						
Yes	509	33.4	1	–	1	–
No	118	46.6	1.8**	1.17–2.65	1.69*	1.1–2.58
<i>Received condoms during last 6 months</i>						
No	429	33.6	1	–	1	–
Yes	197	41.1	1.4	0.98–1.96	1.5*	1.02–2.15

OR, odds ratio; UOR, unadjusted odds ratio; AOR, adjusted odd ratio; CI, confidence interval

* $P < 0.05$; ** $P < 0.01$

effect was not statistically significant (Crepaz et al. 2006). On the other hand, a recent review of behavioural interventions for HIV-positive drug users has found that behavioural interventions for IDUs, including drug abuse treatment programs, needle exchange programs and network-oriented interventions, are effective in reducing drug-related harm (Strathdee and Patterson 2006). Needle and syringe sharing interventions in Vietnam have showed no clear overall pattern of change among IDUs in general, but decreased the sharing of needles and syringes among PLWHA (MOH 2006; Godwin et al. 2005). Thus, needle and syringe intervention programs should be strengthened, but further work is required to assess the strengths and limitations in order to improve the program.

Although the risk of HIV transmission through sharing needles and syringes is very high among IDUs in many countries, sexual transmission is still the major mode of HIV transmission worldwide (UNAIDS 2006). Research

has shown that a significant proportion of PLWHA still practise high risk sexual behaviours. Studies among PLWHA in developed countries have found that a high proportion (more than 20%) continued to have multiple sex partners combined with inconsistent condom use (up to 70%) (Kalichman 2000, 2007). This study has suggested that those who reported multiple sex partners during the preceding years were less likely to use condoms consistently and more likely to engage in needle and syringe sharing behaviour. Several studies have reported sexual bridging behaviours between high risk groups and the general population (Duong et al. 2008; Tran et al. 2005; Tran et al. 2006b). Our study suggested a high potential for HIV transmission from PLWHA to their sex partners through sexual mixing between groups. In most Asian countries, HIV spreads first among IDUs, followed by spread among FSWs via their clients to the general population (Ruxrungtham et al. 2004). The most important

Table 5 Logistic regression analysis of factors for sharing of needles and syringes during the last month among HIV-infected men and women

Factors	N	Prevalence	Unadjusted ORs	95% CI UORs	Adjusted ORs	95% CI AORs
<i>Sex</i>						
Men	2,116	34.0	1	–	1	–
Women	75	48.0	1.7*	1.1–2.77	1.1	0.67–1.85
<i>Age</i>						
≥40	152	28.9	1	–	1	–
30–39	712	29.2	2.5**	1.95–3.08	2.1**	1.65–2.69
25–29	793	29.9	2.5**	2.01–3.20	2.1**	1.59–2.68
15–24	534	51.1	2.6**	1.74–3.79	2.2**	1.41–3.34
<i>Educational attainment</i>						
High school and higher	624	31.6	1	–	1	–
Secondary school	1,203	33.8	1.4**	1.13–1.82	1.3	1.00–1.66
Primary school and less	376	42.3	1.6**	1.22–2.07	1.4*	1.05–1.87
<i>Currently marital status</i>						
Married	559	29.9	1	–	1	–
Not married	1,609	36.4	1.3**	1.09–1.64	1.1	0.87–1.39
<i>Time since HIV status known (in years)</i>						
≥5	467	27.2	1	–	1	–
2–4	1,056	36.6	1.0	0.85–1.28	1.0	0.78–1.21
1	657	37.6	1.6**	1.25–2.09	1.2	0.90–1.58
<i>HIV testing was</i>						
Voluntary	1,077	29.3	1	–	1	–
Mandatory	1,113	39.6	1.6**	1.33–1.89	1.2*	1.01–1.49
<i>Number of sex partners during last 12 months ≥2</i>						
No	1,710	31.1	1	–	1	–
Yes	495	47.1	2.0**	1.61–2.42	1.8**	1.47–2.28
<i>Received needles and syringes during last 6 months</i>						
Yes	483	16.4	1	–	1	–
No	1,709	39.6	3.4**	2.59–4.35	2.7**	2.04–3.53

OR, odds ratio; UOR, unadjusted odds ratio; AOR, adjusted odd ratio; CI, confidence interval

* $P < 0.05$; ** $P < 0.01$

factors affecting the potential of HIV transmission in the general population in Asia seem to be the size of the sex worker population and the frequency with which commercial sex occurs (Ruxrungtham et al. 2004). Low proportion of men visiting sex workers could explain why the HIV epidemic in Vietnam has not spread more rapidly from high risk populations to the general population compared to Cambodia and Thailand (General Statistical Office et al. 2006; Ruxrungtham et al. 2004). There have been few studies in Vietnam addressing sexual behaviours in general population, however, further research in this regard is urgently needed. A 3-year project in 5 provinces in Vietnam, the “Community Action for preventing HIV/AIDS”, observed a steep increase in use of condoms among FWs, IDUs, and migrant workers (Godwin et al. 2005), and these results were highly suggestive of the potential high effectiveness of applying the 100% condom use approach.

Attitudes towards condom use need to be considered carefully in interventions aimed at HIV prevention. We

have found that a high proportion were not willing to initiate condom use. Only about half the participants reported initiating condom use during the most recent sexual intercourse; “dislike” of condom use was most commonly cited, whereas condom availability was a less important reason. Among females, partner objection was the main reason for not having used condoms. Other studies among sex workers have suggested similar reasons for inconsistent use of condoms, i.e. partners’ insistence on condom-free sex, condom unavailability, and feeling uncomfortable about asking clients to use condoms (Rosenthal and Oanha 2006; Tran et al. 2000b). This study suggested that having had received distribution of condoms from a local HIV prevention intervention program during the preceding 6 months were more likely to report consistent condom use. There is an urgent need to assess past preventive efforts among PLWHA in Vietnam, and to apply appropriate and efficacious measures (Crepaz et al. 2006).

VCT has been shown to be an effective HIV prevention strategy and the entry point to care and support for

PLWHA (Bentley et al. 1998; Non-author 2000; Sweat et al. 2000; Van de Perre 2000). Our findings suggested that those who received voluntary HIV testing were more likely to report consistent condom use and less likely to engage in needle- and syringe-sharing than those who received mandatory HIV testing. This could be an indication of a preventive effect of VCT. However, it has been documented that among FSWs, having had an HIV test was associated with having spent time in a rehabilitation centre (Grayman et al. 2005). The majorities of HIV infected in Vietnam were either among IDUs or FSWs, and a substantial proportion of them are likely to have been in rehabilitation centres and to have undergone mandatory HIV testing. These centres provide HIV testing but have lacked proper counselling services. Furthermore, studies on voluntary HIV counselling and testing among pregnant women at antenatal clinics suggested that testing was not offered voluntarily and HIV-negative pregnant women did not receive proper counselling owing to the high workload of health care workers (Dinh et al. 2005; Nguyen 2005). Scaling-up of high quality counselling services related to HIV testing seems a matter of urgency.

This study has several limitations and possible biases. The participants were PLWHA who were registered by the local health system. Although a system for confirming all HIV-reactive samples was in place at the reference laboratories, it has been difficult to assess the coverage of this registration. However, it seems likely that the registers cover the bulk of those being tested for HIV. Since the majorities of HIV infected in Vietnam were either IDUs or FSWs, they are likely to have been in the rehabilitation centres where they can be assumed to have been frequently tested. Accordingly, those with previous experience from the rehabilitation centres are somewhat over represented in the material. This study relied on self-reports of sexual behaviours and practices, which are known to be subject to recall bias and deliberate concealment, and the traditional reluctance to discuss sexual behaviour may result in under-reporting. In addition, the information on non-response was not reported to the project management team adequately. Six provinces reported non-response, i.e. rates between 0% and 6%, and these were in accordance with previous surveys in Vietnam of very low non-response rates.

In summary, our findings suggest that there is high risk of HIV transmission from people already registered as HIV-infected in Vietnam through a combination of high probability of sharing of drug injection equipment and high sexual exposure, i.e. multiple sex partners and limited condom protection. Preventive efforts targeting this group are urgently needed such as risk reduction programmes including promotion and provision of condoms, peer education programmes and VCT.

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