FACTORS AFFECTING NEEDLE SHARING AMONG INJECTING DRUG USERS IN VIETNAM

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ABSTRACT

Needle sharing is the primary mode of human immunodeficiency virus (HIV) transmission for injection drug users (IDUs). This study examines factors affecting needle sharing among IDUs in Vietnam. The data used for analysis was from the Final Evaluation of Preventing HIV in Vietnam that was conducted by the Vietnam HIV/AIDS Prevention Project during November, 2008 to January, 2009. The sample size of IDUs totaled 338.

Results from the binary logistic regression models showed that IDUs who were young were less likely to share needles than those who were older. Similarly, education levels and duration of drug injection were positively associated with needle sharing. Needle sharing is a more common risk behavior among IDUs who lacked perception on HIV/AIDS. In addition, IDUs who received peer educator support along with free needles and syringes were less likely to share needles than IDUs who did not receive these incentives.

The results suggest that there should be government programs to promote needle exchange for injecting drug users and reducing needle sharing among IDUs in Vietnam.

KEY WORDS: HIV/AIDS/ IDUs /PROGRAM/INTERVENTION/ BEHAVIOR

41 pages

CONTENTS

CONTENS (cont.)

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
FHI	Family Health International
HIV	Human Immunodeficiency Virus
IBBS	Integrated Biological and Behavioral Surveillance
IDU	Injecting Drug User
MAP	Monitoring the AIDS Pandemic Network
MOH	The Ministry of Health of Vietnam
PLWHA	People living with HIV/AIDS
STD	Sexually Transmitted Disease
UNAIDS	The United Nations Joint Program on HIV/AIDS
VAAC	Vietnam Administration of HIV/AIDS Control
WHO	World Health Organization

CHAPTER I
INTRODUCTION

1.1 Background and rationale

The HIV epidemic appeared for the first time in 1981 and up to now many countries in the world have faced this dangerous epidemic. HIV/AIDS not only has an influence on human health, it also influences economies and society (UNAIDS, 2008). The estimated numbers of people living with HIV/AIDS (PLWHA) is 33.4 million people (31.1 million–35.8 million) at the end of 2008. This number was more than 20% higher than in 2000, and the prevalence was roughly threefold higher than in 1990. The numbers of AIDS death was 2.0 million (1.7 million–2.4 million) and the total people newly infected with HIV was 2.7 million (2.4 million–3.0 million) by the end of 2008, (UNAIDS, 2009).

The HIV infections rate is still high in Asia, with national HIV infection levels being the highest in Southeast Asia (UNAIDS, 2008). In Asia, about 4.7 million (3.8 million–5.5 million) people were living with HIV/AIDS in 2008, and numbers of new HIV infections in the same year was approximately 350,000 people (UNAIDS, 2009).

Although Vietnam has made much effort to control the HIV epidemic, the rate of people who are infected by HIV still increases and the HIV epidemic in Vietnam is a concentrated epidemic. Up to December 31 2009, the number of people living with HIV/AIDS was 160,019; including 35,603 AIDS cases and 44,540 patients who have died of AIDS (MOH, 2009b). All 63 provinces/cities, 98% of the districts, and more than 71% of the communes reported HIV infections. In Vietnam, HIV prevalence was 0.53 per total general population by the end of 2009. The rate infected by HIV by gender is different, with males about three times higher than female.

In Vietnam, half (50.6%) people living with HIV were injecting drug users (IDUs) (MOH, 2009b). More than 4.5 million people in Asia are estimated to inject drugs in 2008 (UNAIDS, 2009). Modes of HIV transmission are different between

regions. For instance, sexual transmission is most common route of transmission in South and Southeast Asia and in Africa while in Eastern Europe the main transmission route is blood contact due to sharing injection equipment (UNAIDS, 2008). However, the proportions of IDU who were HIV infected in Vietnam is the highest in total people living with HIV/AIDS (MOH, 2009a).

Injecting drug users in Asia report high rates of risk behavior, a study in China indicates that 40% of IDUs shared needles in the six months priors to the study (Wang et al, 2009). A survey in Pakistan reported that 67% of IDUs shared needles during the previous week (Bokhari et al., 2007), and another in Nepal in 2008 shows that more than 50% of the participant reported injecting drugs with needle or syringe that were previously used by another in the past year. The same sample found that 70% of those reported engaged in sharing injection equipment with multiple persons (Poudel et al., 2008). According to the HIV/AIDS Integrated Biological and Behavioral Surveillance in Vietnam (IBBS), risk behavior was high among IDUs including 12% to 33% sharing needles during the previous 6 months and 20% to 40% having sex with commercial sex workers during the previous 12 months (MOH, 2006).

The needle sharing behavior is a major concern for HIV prevention programs in Vietnam as injecting drug use is one of the main ways to become HIV-infected, as was the case in 2008 with 56% of new HIV cases being IDUs (MOH, 2009a). According to results of annual sentinel surveillance in 2005, HIV prevalence rate of IDU at the national level increased from 9% in 1996 to 30 % in 2005 (MOH, 2005).

HIV prevalence among IDUs is different across provinces. The rate in Quangninh province was 59%, Haiphong province was 66 % and Angiang province was 13% (MOH, 2006). Since the needles syringe exchange program was implemented in 2005, the HIV transmission trend has begun to decline among IDU and HIV prevalence also decreased (MOH, 2009a). However, the prevalence of IDU in total people living with HIV/AIDS in Vietnam is still high at about 51% in 2009 (MOH, 2009b).

Sharing of injecting equipment is a highly efficient way of transmitting HIV, which is a main factor for HIV transmission (MAP, 2005). Through needles and syringes, HIV can pass directly into the blood and is one reason why HIV spreads so

quickly among drug injectors, and HIV is easiest to transmit to others when high levels of the virus are present in a person's blood (Schoembaum et al., 1988).

IDUs can be seen as most at risk population with needle sharing their main risk behavior for HIV transmission (Vickerman et al., 2007). To understand more about factors affecting needle sharing behavior, these factors will be useful for needle and syringe exchange project and the results of this analysis might have a profound impact on the nature of future initiatives and intervention programming in Vietnam.

In Vietnam, IDUs are the main objectives of the harm reduction program. The harm reduction program focused on IDUs, female sex workers and men who have sex with men. The activities of harm reduction program has focused on three main components needles and syringes distributions, distributing condoms and counseling for behavior change based on setting up collaborators, and peer educators' networks and health workers. Its main objective is to increase the percentage of IDU with safe injecting practices and take part in harm reduction activities of peer educators to increase the percentage of female sex workers using condoms, and to ensure availability of needles and condoms used in the harm reduction program.

1.2 Research question:

Which factors affect needle sharing among injecting drug users in Vietnam?

1.3 Objective:

Ultimate objective: Findings in this study will provide necessary information for needle exchange programs for injecting drug users.

Immediate objective: To examine factors affecting needle sharing behavior among injecting drug users in Vietnam.

CHAPTER II
LITERATURE REVIEW

2.1. Socio-demographic characteristics and needle sharing among IDUs

Age and needle sharing behavior

Most IDU in Vietnam are young people (MOH, 2006) and being of a young age is indicated to associate with sharing needles among HIV-infected IDUs (Thanh et al., 2008; De et al., 2009). A study in Pakistan 2005 shows that younger age (28-31 years) was associated to receptive needle sharing, this study also found that IDUs are young and those who knew about HIV being spread through contaminated needles are less likely to share needles (Parviz et al., 2005). Similarly, one of the few longitudinal studies on needle sharing in the United State indicates that needle sharing was associated with younger age and having a sex partner who was an injecting drug user (Saxon et al., 1992). Furthermore, another study in the U.S among IDUs, an examination of the association of demographics and sharing needles shows that demographics and situational factors (perceived susceptibility and AIDS anxiety) also play a role in needle sharing behavior among IDUs (Gibson et al., 1993).

Gender and needle sharing behavior

Gender is related with sharing needles among HIV infected IDUs, most of which are male with older males being associated with sharing needles (Zhang et al., 2007; Burchell et al., 2003). Another study in Hong Kong shows that the male gender are more likely to have engaged in HIV related risk behavior including needle sharing, unprotected sex and having multiple sex partners (Li et al., 2006). In addition, one study in Canada also shows that factors such as younger age, male gender, and frequent mutual injections were stronger predictors of equipment sharing (De et al., 2009). Alternatively, one study in Taiwan 2007 shows that younger females are likely to share injection paraphernalia (Cheng et al., 2007).

Marital status and needle sharing behavior

Most IDUs are currently single or divorced (Cheng et al., 2007; Yan et al., 2008)) Marital status was associated with sharing among IDUs, with people having needle sharing in the last month was more popular among those currently married than those who are not (Dalgard et al., 2009). However, a study in Nepal found that marital status and age of IDU was not statistically significant between sharing needles among IDUs (Poudel et al., 2009).

Education and needle sharing behavior

Low education levels associate with sharing needles among IDUs (Strathdee, 1997; Parviz et al., 2005). According to Thanh (2008), low education of IDU has a relationship with sharing needles but also a relationship exists with inconsistent condom use (Thanh et al., 2008). In addition, Cheng (2007) in Taiwan shows that there are association between low education level, inadequate family support and sharing paraphernalia (syringe and water) (Cheng et al., 2007). However one study in China did not find the relationship between education, income and HIV infection among IDUs (Jia et al., 2008).

Occupation and needle sharing behavior

Employed status is indicated to have a relationship with sharing needles (Wylie, Shah, and Jolly, 2006; Parviz et al., 2005). In Vietnam today, commercial sex workers and IDU are illicitness, and are both regarded as “social evils” (Hong et al., 2004), so IDUs have difficulty when seeking a job. It may have an affect on them to encourage risky behavior such as sharing needles and unsafe sex (Tran et al., 2006). However, a study in Nepal found that employed status of IDU was not associated with sharing needles among IDUs (Poudel et al., 2009)].

2.2. Knowledge and perception of HIV/AIDS and needle sharing among IDUs

Low HIV/AIDS knowledge is indicated to have a relationship with needle sharing behavior among IDUs (Purcell et al., 2006). One study in Son La province-Vietnam 2007 indicated that needle sharing is a more common risk behavior among male IDUs who are lacking in HIV knowledge (Dung, 2007). People living with HIV/AIDS in Vietnam, who are IDUs are associated with higher HIV risk behavior

including sharing needles (Thanh et al., 2008). A study by Chen et al in China 2007 also shows that better HIV knowledge has a relationship with low rates of sharing needle among IDUs (Chen et al., 2007). However, Hien et al in Vietnam 2001 indicate that there is no association between HIV knowledge and sharing needle among IUDs in their study and a similar study in Sub-Saharan Africa prior to 1996 (Hien et al., 2001; Hargreaves et al., 2008).

In Hungary a study finds that 68% of IDU have shared injecting equipment; syringes, cookers and filters. This study also finds that sharing of injecting equipment was associated with perceived susceptibility to HIV/AIDS (Racz et al., 2005). For IDUs who have low perception of HIV infection status are significantly associated with history of drug use (Essien et al., 2008). Sharing of injecting equipment was associated with perception of HIV/AIDS status (Parviz et al., 2005).

2.3. Duration of injecting drug use and needle sharing among IDUs

New injectors rarely inject alone, normally injection behavior is learned from experienced IDUs. This is evident in a recent study where a similar frequency of risk behavior among new and established IDUs was observed (Sutton et al., 2008). In addition, a relatively high prevalence of HIV has been found among new injectors, and young age at first injection has a relationship with receptive needle sharing among IDUs (Parviz et al., 2005). In highly endemic regions of China, 34.9% of IDUS who had injected for less than five years were infected by sharing needles (Jia et al., 2008). Similarly, a study conducted in India reported an HIV prevalence of 14% among IDUs who had injected for one year or less, compared to 21% among IDUs who had injected for six years or less (Solomon et al., 2008). In the United States sharing needles was associated with age at first time of injection (Agha et al., 2003).

2.4. Access to intervention program and needle sharing among IDUs.

Receiving free needles and syringe

Harm reduction intervention programs such as needle and syringe exchange support for IDUs have been shown to be successful in reducing their HIV

risk behavior. Some studies have been conducted to evaluate preventive interventions aimed at reducing needles and syringe sharing among IDUs. A study in United States shows that receiving free needle and syringe among IDUs was highly effective in reducing unsafe drug injection (Ksobiech, 2003). Free access to fresh injection equipment is directly related to sharing among IDUs in United State (Magura et al., 1989; Bailey et al., 2002). A research of needle sharing for IDUs in Vietnam found that who had ever received free needle and syringe from the harm reduction intervention program during the previous 6 months are less likely to share needles (Thanh et al., 2008).

Similarly, a study in Netherland also shows that the availability of syringes has a relationship with needle sharing among IDUs (Grund et al., 1991). IDUs who could not obtain new needles when needed were more likely to share injection equipment, and the study also found that IDUs who drank alcohol are more likely to share injection equipment (Poudel et al., 2009), but effects of harm reduction intervention program on needle sharing were non-significant (Crepaz et al., 2006)

Receiving peer educator support

A cross-sectional study by Vazirian in Iran among IDUs shows that sharing of needle/syringe in the past month was significantly lower among IDUs who received 7 syringes per week than those who did not from peer educator (Vazirian et al., 2005). Similarly, a study by Latkin et al in 2008 shows that peer support in safer injection practices was associated with reporting no sharing of injection equipment. The study also shows that higher levels of psychological distress were associated with a greater likelihood of reporting drug paraphernalia sharing. (Latkin et al., 2008).

2.5. HIV prevention information from mass media and needle sharing

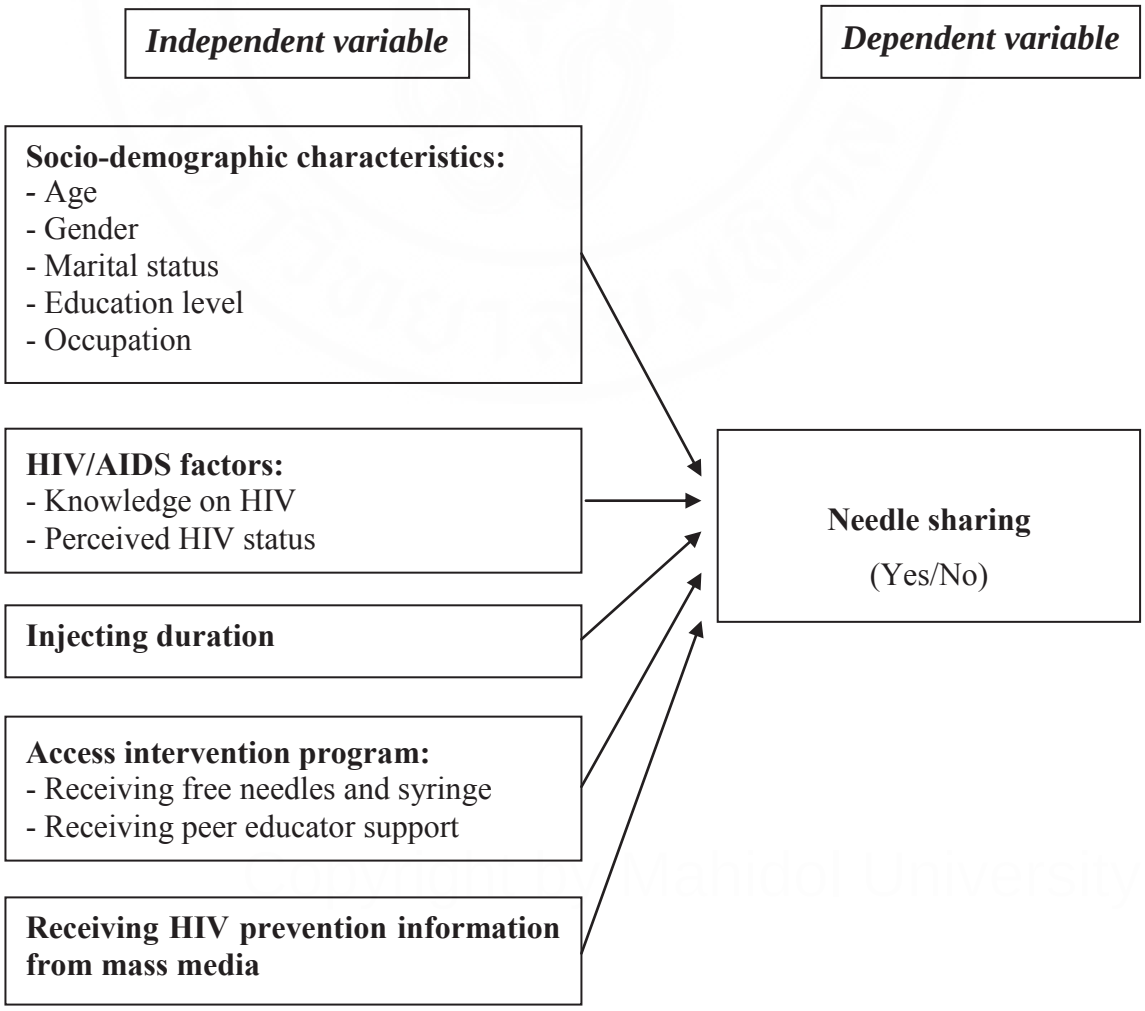
In the context of HIV, receipt of HIV prevention information from mass media can help to change underlying social attitudes and behaviors that contribute to HIV risk and vulnerability (UNAIDS, 2008). One study in Son La province-Vietnam 2007 indicates that male IDUs who did not have information about HIV from mass media are 64.7% more likely to share needles than male IDUs who receive HIV information from mass media. In addition, the result shows that if the score of

HIV/AIDS knowledge increase by one unit, an IDU is 13.6% less likely to share needles (Dung 2007).

2.6 Conceptual framework

From the literature review, it has been found that IDU's sharing needles varies by socio-demographic characteristics, HIV/AIDS factors, injecting duration and access to intervention programs. In this study the research concerns behaviors on needle sharing among IDUs. Access to intervention programs (receive needles and syringes), and individual characteristics (socio-demographics, HIV/AIDS factors, and injecting duration) would be considered the factors affecting the behavior of sharing needles among IDUs as found in the conceptual framework (Figure 2.1)

Figure 2.1: Conceptual Framework



2.7 Research hypothesis

1. IDU who had knowledge on HIV are less likely to engage in needle sharing.

2. IDU who had a longer duration of injecting drugs, are less likely to engage in needle sharing.

3. IDU who had access to HIV intervention programs such as receiving free needles and syringe/receiving peer educator support were less likely to practice unsafe injecting behavior than those who have no access to HIV intervention program.

CHAPTER III
RESEARCH METHODOLOGY

3.1 Source of data

The source of data for this study is from the "Final Evaluation of Preventing HIV in Vietnam" of Vietnam's HIV/AIDS Prevention Project during November 2008 to January 2009. Information was gathered from IDUs who were living in seven provinces including Ho Chi Minh, Hanoi, Quang Ninh, Hai Phong, Da Nang, Can Tho, and An Giang, with the majority of IDUs in Vietnam are living in these provinces.

The aim of the survey is to evaluate the harm reduction intervention programs, information education communication programs, the control and treatment of sexually transmitted infections, project control programs and impact of prevention project for HIV in Vietnam.

3.2 Research instrument

The structured questionnaire was used for collecting the data and includes questions on background characteristics, knowledge of HIV/AIDS and sexually trasmitted infections, drug injection and sexual behavior, perception of HIV infection, and accessibility of harm reduction program for IDUs. Only selected questions on are used in this study.

3.3 Sampling method

The random sampling method was applied for this study. A total of seven provinces were selected due to their high prevalence of IDU, with three districts of each province. The stakeholders and peer educators listed all IDU who lived in the selected districts at the time of survey. The samples of 644 IDUs were then ramdomly selected from the list to be the respondents for the survey. However, since this current

study foucsed on IDUs who committed drug injection during the 6 months before the survey, the samples for the analysis of this study was only 338 IDUs.

3.4 Operational definition of variable

3.4.1 Dependent variable

Needle sharing: Needle sharing is defined as the borrowing and lending of needles and syringe 6 months before the survey. If the IDUs ever shared, borrowed or lended they will be coded as 1, and 0 if not.

3.4.2 Independent variables

Independent variables are divided in five groups: ***Socio-demographic characteristics*** with five main independent variables (Age, gender, marital status, education and occupation), ***HIV/AIDS factors, injecting duration, access intervention programs*** (Receiving free needles and syringe, receiving peer educator support), and ***receiving HIV prevention information from mass media***.

Socio-demographic characteristics:

* **Age**: refers to age up to their last birthday in years.

* **Gender**: gender of IDUs include male and female.

* **Marital status**: marital status at time of the survey and classified 2 categories including single and ever married including currently married, divorced, separated and widowed.

* **Education level**: refers to highest level of education completed by the IDUs at the time of the survey and classified into 3 categories: Illiteracy or primary school; secondary school; high school or higher.

* **Occupation**: refers to current occupation of IDUs at the time of the survey. The question included six categories and was divided into two groups: currently employed or currently unemployed. For currently employed it includes staff, worker, business and others, while for currently unemployed it includes student and no job.

HIV/AIDS factors

*** Knowledge on HIV/AIDS**: Seven questions are posed to IDUs to assess their knowledge on HIV/AIDS. For each correct question, IDUs would get one score.

The score ranged from 0 to 7, with the higher the score meaning one has more knowledge on HIV/AIDS.

Questions included to asses knowledge of HIV/AIDS infection:

1. Fidelity can reduce risk of HIV infection?

2. Person can be HIV-infected, if he/she shared a toilet with someone who is HIV-positive?

3. Do you think correct condom use can prevent HIV transmission during sexual intercourse?

4. Do you think HIV can be transmitted through mosquito or insect biting?

5. Do you think sharing syringe increases the risk of HIV infection?

6. Do you think cleaning a contaminated syringe with water reduces the risk of HIV infection?

7. Do you think abstinence from sexual intercourse can prevent HIV infection?

*** Perceived HIV status*:*** refers to IDU's thought whether their HIV status is positive, negative or unknown

Injecting duration: refers to the number of years that IDUs had been injecting drugs. It is counted from the first injection up to the time of survey.

Access intervention program:

*** Receiving free needles and syringes**: IDUs reported to receive free needles and syringes during 6 months prior to the survey.

*** Receiving peer educator support**: IDUs who ever received any assistance from peer educators during 6 months prior to the survey (condom/syringe/counseling).

Receiving HIV prevention information from mass media: This relates to IDUs exposure to mass media: television, radio and newspapers. This variable is defined as that IDUs who ever received any HIV prevention information from television, radio and or newspaper during 6 months before the survey.

Table 3.1: Summary of operational definition of variables

Variable	Definition	Level of Measurement
Dependent variables		
Needles and syringes sharing	IUDs who ever borrowed or lent needles and syringes with other IDUs during 6 months before the survey	*Nominal* 0 = No 1 = Yes
Independent variables		
Socio-demographic		
Age	Age of IDUs the time of the survey	*Interval*
Gender	Male or female	*Nominal* 0 = Female 1 = Male
Marital status	Marital status of IDUs the time of the survey	*Nominal* 0 = Single 1 = Ever married
Education level	Highest level of education of IDUs the time of the survey	*Ordinal* 0 = Illiteracy or primary 1 = Secondary school 2 = High school or higher
Occupation	Question are divided into two groups as currently employed or currently unemployed	*Nominal* 0 = Unemployed 1 = Employed
HIV/AIDS factors		
Knowledge on HIV/AIDS	Seven questions asked IDUs for their knowledge on HIV/AIDS. For each correct question IDUs would get one score	*Ordinal*

Perceived HIV status	IDU's thought whether his/her HIV status is positive 0= Negative or unknown 1= Positive	*Nominal* 0 = No 1 = Yes
Injecting duration	Number of years that IDUs ever-injected drug. It is counted from the first injection up to the time of survey	*Interval*
Access intervention program		
Receiving free needles and syringes	IDUs reported to receive free needles and syringes from intervention program in the six months prior to the survey	*Nominal* 0 = No 1 = Yes
Receiving peer educator support	IDUs who ever received any assistance from peer educators	*Nominal* 0 = No 1 = Yes
Receiving HIV prevention information from mass media	IDUs who reported receive HIV prevention information from mass media	*Nominal* 0 = No 1 = Yes

3.5 Data analysis

Univariate statistics, such frequency distribution, mean, median and standard deviation are used to describe basic socio-demographic characteristics (age, gender, marital status, educational level and occupation), HIV/AIDS factors, access to intervention programs and HIV prevention information from mass media along with needles sharing behaviors.

Bivariate analyses such as cross tabulation are used to examine the needle sharing behavior of IDUs who have different socio-demographic characteristics, HIV/AIDS factors, access intervention programs, HIV prevention information from mass media.

Binary logistic regression models were used to examine the effect of the independent variables on needle sharing of IDUs.

3.6 Ethical aspects

All respondents participated anonymously and voluntarily in the survey. Before the interview, the interviewers introduced them to the purpose and meaning of the interviews, as well as the right of participants to refuse to take part. Interviewees signed informed consent forms for confirmation of agreements by verbal to be interviewed. In addition, this study got the approval from the Institutional Review Board of Institute for Population and Social Research, Mahidol University.

3.7 Limitation of the study

The data in this study is secondary in nature and therefore it is difficult to establish all of the causes affecting the sharing needle behavior among IDUs. In addition, some important characteristics of IDU were not collected, for example frequency of needles shared by IDU. The samples size of this study were from seven provinces, so they may not be the representatives of all IDUs in Vietnam.

CHAPTER IV
RESULTS AND DISCUSSION

This chapter is divided into four sections. The first section provides univariate analysis of socio-demographic characteristics (age, gender, marital status, education level, and occupation), HIV knowledge, and perceived HIV status, injecting duration and intervention programs. The second section provides bivariate analysis of independent variables and needle sharing behavior. The third section examines determinants of needle sharing behavior among IDUs during the 6 months before the survey by using binary logistic model analysis in which odds ratio and 95% confidence intervals are adjusted to indicate statistical associations at 5% level of significance. The fourth section discusses the results of the analyses in this study.

4.1 Univariate analysis

Table 4-1 reveals some selected socio-demographic characteristics for the 338 IDU who participated in this study. The average age was 31.9 years old with 25-34 years old comprising 54.1% 13.6% of them under 25 years old, 25.7% are 35-44 years old and only 6.5% are 45 years old or higher (minimum=17 years and maximum=68 years; standard deviation=7.5 years). Ninety-two percent of IDUs in this study were male, with the proportion of male in this study being the same as previous studies in Vietnam (Thanh et al., 2008; Tran et al., 2006). Almost half (46.4%) of them had secondary education while 15.4% had primary education and 38.2% had high school or higher. Half of IDUs were single (53.3%) whereas 36.1% were married and 10.6% were separated/divorced/widowed. In addition, more than half of them were employed (63.3%).

Table 4-1: Number and percentage distributions of IDU by socio-demographic factors.

Characteristics	*Number*	*Percentage*
Age		
Less than 25	46	13.6
25 - 34	183	54.1
35 - 44	87	25.7
45 and higher	22	6.5
Median = 31.0; mean = 31.9; SD = 7.5; max = 68; min = 17		
Gender		
Male	311	92.0
Female	27	8.0
Marital status		
Single	180	53.3
Married	122	36.1
Divorced/ separated/widow	36	10.6
Education		
Illiteracy/primary school	52	15.4
Secondary school	157	46.4
High school or higher	129	38.2
Occupation		
Employed	214	63.3
Unemployed	124	36.7
Total of each characteristics	*338*	*100*

In Table 4-2, the average score of HIV knowledge was 4.5 scores (minimum=0 score and maximum=7 scores; standard deviation=0.9 scores). More than half of IDUs (54.4%) have 5 scores of HIV knowledge, while more than half of participants (59.5%) perceived that their HIV status was positive.

Table 4-2: Number and percentage distributions of IDU by HIV/AIDS factors

Characteristics variable	*Number*	*Percentage*
Knowledge on HIV (score)		
0	1	0.3
1	1	0.3
2	1	0.3
3	51	15.1
4	84	24.9
5	184	54.4
6	15	4.4
7	1	0.3
Median = 5.0; mean = 4.5; SD = 0.9; max = 7; min = 0		
Perceived HIV status		
Positive	201	59.5
Negative/unknown	137	40.5
Total of each characteristics	*338*	*100*

Table 4-3 shows that the mean for drug injection duration was 9.2 years (minimum=0 year and maximum=45 years; standard deviation=6.3 years). Nearly half of IDU (45%) had a history of drug injection over 10 years. The percentage of IDUs who had shared needles was 32% during six months prior to the survey.

Table 4-3: Number and percentage distributions of IDU by drug injecting characteristics of IDUs

Characteristics	*Number*	*Percentage*
Injecting duration		
0 – 4 years	76	22.5
5 – 9 years	110	32.5
Over 10 years	152	45.0
Median = 9.0; mean = 9.2; SD = 6.3; max = 45; min = 0		
Needles and syringes sharing during six months		
Yes	108	32.0
No	230	68.0
Total of each characteristics	*338*	*100*

Table 4-4 shows that 77.2% of IDU received needles and syringes from the intervention program during the last 6 months, and 69.5% of IDUs received peer educator support from the intervention program in the same period.

Table 4-4: Number and percentage distribution of IDU by access to the intervention program

Characteristics	*Number*	*Percentage*
Received needles and syringes		
Yes	261	77.2
No	77	22.8
Received peer educator support		
Yes	235	69.5
No	103	30.5
Total of each characteristics	*338*	*100*

Table 4-5 shows that 79.9% of IDUs received HIV prevention information from mass media during last 6 months and only 20.1% of IDUs did not receive information from mass media.

Table 4-5: Number and percentage distribution of IDUs who received HIV prevention information from mass media

Characteristics	*Number*	*Percentage*
Received HIV prevention information from mass media during 6 last months		
Yes	270	79.9
No	68	20.1
Total	*338*	*100*

4.2 Bivariate analysis

Table 4-6, shows that the proportion of IDU age less than 25 years old who shared needles and syringes is the highest (65.2%), followed up by IDUs aged between 25 to 34 years (32.8%) and 35 years old and higher (16.5%). Two-third IDUs who did not share needle are 25 to 34 years old or higher. Females had shared needles (63%) more than male (29.3%). In addition, IDUs who were illiterate or only finished primary school have the highest proportion of needle and syringe sharing (55.8%), while most

IDUs who completed secondary of higher did not share needle. For marital status, level of sharing needles and syringes is the highest for singles (37.8%), compared with IDUs who were ever married (25.3%). Regarding occupation, the proportion of IDUs who were currently employed had shared needles (29.9%) and is lower than those who were currently unemployed (35.5%).

Table 4-6: Percentage distribution of IDU by socio-demographic characteristics

Characteristics	*Sharing needles (N=338)*		
	No	Yes	Number
Age			
Less than 25	34.8	65.2	*46*
25 - 34	67.2	32.8	*183*
35 and higher	83.5	16.5	*109*
Gender			
Male	70.7	29.3	*311*
Female	37.0	63.0	*27*
Marital status			
Single	62.2	37.8	*180*
Ever married	74.7	25.3	*158*
Education			
Illiteracy/primary school	44.2	55.8	*52*
Secondary school	73.2	26.8	*157*
High school or higher	71.3	28.7	*129*
Occupation			
Employed	70.1	29.9	*214*
Unemployed	64.5	35.5	*124*

According to Table 4.7, IDUs who had poor knowledge of HIV/AIDS shared needles and syringes at a higher rate than IDUs who had good knowledge of HIV/AIDS (39.1% vs. 27%). Those IDUs who perceived themselves to have a positive HIV status, shared needles more than IDUs who perceived themselves to be negative/unknown HIV status (40.8% vs. 19%). IDUs that have been injecting fewer than 5 years had the highest percentage of needle sharing (60.5%) compared with 5 to 9 years (32.7%) and over 9 years (17.1%).

Table 4-7: Percentage distribution of IDUswho shared needles and syringes by knowledge and perception of HIV/AIDS and injecting duration

Characteristics	*Sharing needles (N=338)*		
	No	Yes	Number
Knowledge HIV			
Poor knowledge (0 - 4 score)	60.9	39.1	*138*
Good knowledge (5 - 7 score)	73.0	27.0	*200*
Perceived HIV status			
Positive	59.2	40.8	*201*
Negative/unknown	81.0	19.0	*137*
Injecting duration			
0 – 4 years	39.5	60.5	*76*
5 – 9 years	67.3	32.7	*110*
Over 10 years	82.9	17.1	*152*

Table 4-8 shows that IDUs who received needles and syringes, had a lower proportion of sharing (25.3%) than those who did not (54.5%). Similarly, the percentage of IDUs who received peer education support from intervention programs during the last 6 months shared needles and syringes less (22.6%), compared to those did not (53.4%). The percentage of IDUs who received HIV prevention information from mass media during last 6 months and shared needle was 29.6% which less than the percentage of those who did not (41.2%).

Table 4-8: Percentage distribution of IDUs who shared the needles and syringes by accessing HIV intervention programs and HIV prevention information.

Characteristics	*Sharing needles (N=338)*		
	No	Yes	Number
Received needles and syringes			
Yes	74.7	25.3	*261*
No	45.5	54.5	*77*
Received peer educator support			
Yes	77.4	22.6	*235*
No	46.6	53.4	*103*
Received information from mass media			
Yes	70.4	29.6	*270*
No	58.8	41.2	*68*

4.3 Multivariate Analysis

The dependent variable is a dichotomous variable so the binary logistic regression model is appropriate for this study. There were two models used to analyze association between independent and dependent variables. The first model, called Model 1, considered the association of socio-demographic characteristics on risk of needle sharing only. The second model, Model 2, is in order to examine association among all independent variables on the dependent variable.

From Model 1, the results indicated that the socio-demographic characteristics including age, gender, marital status, education and occupation together can explain 14% of variation of needles and syringes sharing behavior among IDUs in Vietnam. The results show that there are three socio-demographic characteristics, age, gender, and education level, that had a significant association with needle sharing behavior. Male IDU were 3.5 times more likely to share needle than female ($p<0.01$). IDUs who completed secondary school were 2.9 times more likely to share needle than IDUs who were illiterate or have primary school significant level at the 0.01 level. The odds analysis discovered that with every one year increase in age of IDUs they are 10% less likely to share needles ($p<0.001$).

Model 2 added additional variables including HIV factors, injecting duration, access to intervention program and receiving HIV prevention information through mass media. Results show that all independent variables together explain 30% ($p<0.001$) of the needle and syringe sharing behavior. Knowledge on HIV of IDUs was not significant with needle sharing behavior, but for perceived HIV status, the results indicated that IDUs who perceived that they had positive HIV status were 4.6 times more likely to share needles than those with perceived negative or unknown HIV status at the 0.001 level. Regarding injecting duration of IDUs, durations of drug injection was positively associated with needle sharing. IDUs that increase by one-year of injection history were 11% less likely to share needles.

In regards to access to HIV intervention program, the odds of sharing needles for IDUs who reported to receive free needles and syringe were 53% less likely to share needles compared to those who did not receive free needles and syringe ($p<0.05$). For receiving peer educator support with decreased probability of unsafe injecting

behavior, IDUs who received peer educator support were 76% less likely to share needles compared to those who did not received ($p<0.001$). However, IDUs who had received HIV prevention information were not significant with needle sharing behavior of IDUs. In addition, odds ratio of age from Model 2 is higher than Model 1 (0.90 vs. 0.94). However, in Model 2 gender did not have an affect on needle sharing. Similarly to Model 1, education level in Model 2 had an affect on needle sharing behavior, IDUs who completed secondary school were 2.6 times more likely to share needle than IDUs who are illiterate or have primary school ($p<0.05$),

Ultimately, Model 2 explains for 30% variation of needle sharing when adding more variables including HIV factors, injecting duration, access intervention program and receiving HIV prevention information by mass media ($p < 0.001$). It means that adding some independent variables increases 16% explanation of needle sharing variation between the two models (14% vs. 30%).

Table 4-9: Logistic regression analysis of characteristics for sharing of needles and syringes of IDUs.

Characteristics	Odds ratio	
	Model 1	Model 2
Age	**0.90*** **	**0.95***
Gender		
Female *(ref)*		
Male	**3.53****	2.85
Marital status		
Single (ref)		
Ever married	0.67	0.77
Education		
Illiteracy/ primary school (ref)		
Secondary school	**2.88****	**2.64***
High school or higher	0.82	0.69
Occupation		
Unemployed (ref)		
Employed	0.97	0.97
Knowledge on HIV		0.75
Perceived HIV status		
Negative/unknown (ref)		
Positive		**4.63*****
Injecting duration		**0.89****
Received needles and syringes		
No (ref)		
Yes		**0.47***
Received peer educator support		
No (ref)		
Yes		**0.24*****
Received HIV prevention information		
No (ref)		
Yes		0.85
LR chi-square	**59.33*****	**126.89*****
Pseudo R square	**0.14**	**0.30**

Note: ** significant level at 0.05, **significant level at 0.01, *** significant level at 0.001.*

Simulated results

The odds ratios obtained from logistic regression models were used to generate a series of predicted probabilities of occurring needle sharing behavior among those who perceived themselves as HIV positive or not, and those who accessed or not with the intervention programs for IDUs. The following figures (4.1-4.3) present the predicted probabilities of occurring behavior when IDU perceived HIV status and accessed the intervention program.

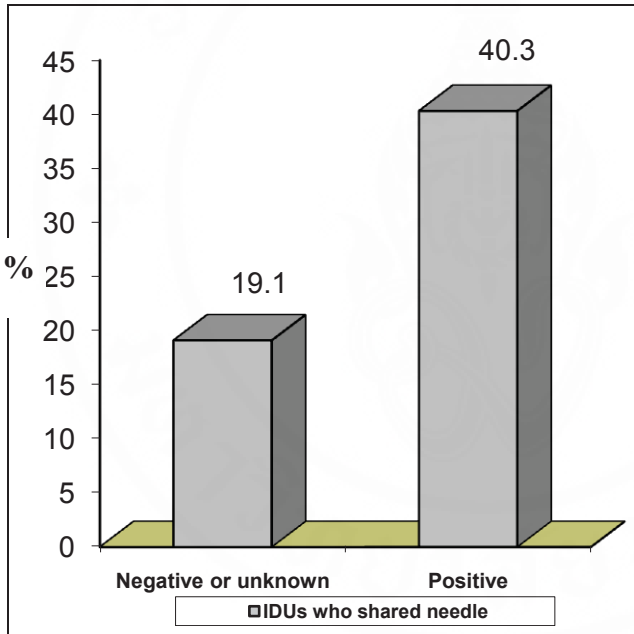


Figure 4-1 displays the net effects of perceived HIV status on needle sharing. IDUs who perceived themselves as HIV positive, the predicted proportion of IDU sharing would be 40.3%. Conversely, IDU who perceived themselves as negative or unknown to HIV, the predicted proportion of IDU sharing decreases to 19.1%. The results suggest that perceived HIV status positively affects needle sharing behavior.

Figure 4-1: Simulated effects of perceived HIV status on needle sharing behavior.

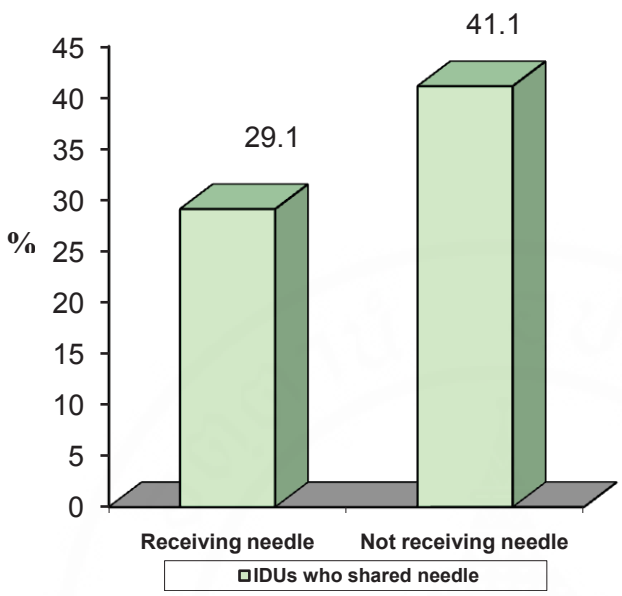
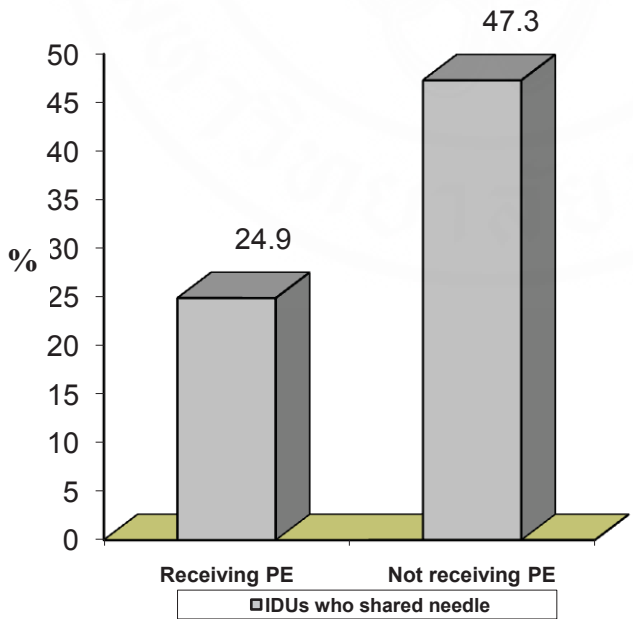


Figure 4-2 displays the net effects of receiving free needles and syringes on needle sharing. IDUs who received free needles and syringe, the predicted proportion of IDU sharing would be 29.1%. On the contrary, IDUs who did not receive free needles and syringe, the predicted proportion of sharing increases to 41.1%. The results suggest that receiving free needles and syringes negatively affects needle sharing behavior.

Figure 4-2: Simulated effects of receiving free needles and syringe on needle sharing behavior.



***PE: Peer educator support**

Figure 4-3 displays the net effects of received peer educator support (PE) on needle sharing. IDUs who received peer educator support, the predicted proportion of IDU sharing would be 24.9%. Conversely, IDU who did not receive peer educator support, the predicted proportion of IDU sharing increases to 47.3%. The results suggest that receiving peer educator support affects needle sharing behavior.

Figure 4-3: Simulated effects of receiving peer educator support on needle sharing behavior.

4.4 Discussion

The results show that a major percentage of IDU in this study were young, most of them were male, unmarried and unemployed, which is the same as other findings (De et al., 2009; Hien et al., 2001; Thanh et al., 2008).

Sharing needles is a key risk behavior to transmit HIV infection among IDU and now this behavior is increasingly common among IDU, especially since many prefer injecting to smoking because it is a more economical and effective method to introduce heroin. Aside from the few IDU who inject drugs for themselves, friends or drug dealers can inject others. IDU in this study reported that 32% of them ever-shared needles and syringe in the six months prior to survey. This result is consistent with the HIV/AIDS Integrated Biological and Behavioral Surveillance of Vietnam (MOH, 2006; MOH & FHI, 2006; Thanh et al., 2008). It is argued that the proportion of IDU sharing equipment, accompanied with the high HIV prevalence rate of IDU in the total population living with HIV is about 51% (MOH, 2009b), and is why the HIV epidemic in Vietnam is predominantly concentrated among IDU.

Results also demonstrate that age of IDUs, who are male and education level are associated with needle sharing (Hien et al., 2001; Thanh et al., 2008; De et al., 2009; Strathdee, 1997; Parviz et al., 2005; Zhang et al., 2007; Li et al., 2006). In addition, injecting duration and perceived HIV-positive status were associated with needle sharing (Parviz et al., 2005 ; Jia et al., 2008; Racz et al., 2005; Essien et al., 2008).

Perceived HIV-positive status was associated positively with risk behaviors among IDUs in this study. However, it is difficult to jump to conclusion that this cause affects needles sharing behavior. Most IDUs know that sharing needles will increase their risk of HIV infection but they still share needles, with many feeling okay to share needles with other injecting friends (Hoang et al., 2002; Yan et al., 2008). Some IDU, who perceived that they were already HIV-positive, felt more at ease to accept needle sharing with others; they do not know that it is possible to be infected with other kinds of HIV. More dangerously, some IDU have thoughts of revenge when they know they are infected with HIV and are willing to share needles with any IDU they meet. Nevertheless, one study in Nepal shows that HIV-positive IDU were less likely to share needle than those who were HIV-negative (Parviz et al.,

2005). Thus, there was little supported evidence for a conclusion that IDU who perceived themselves as HIV-positive made them more likely to practice risk behaviors. The conclusion of this study should be that there was a positive association between perceiving HIV-positive status and practicing risk behaviors.

Short duration of drug injection was associated positively with needle sharing behavior in the study. Normally, long duration of drug injection was associated positively with needles sharing (Solomon et al., 2008; Racz et al., 2005). But some study also indicated that new injectors rarely inject alone; normally injection behavior is learned from experienced IDUs, and is evident that new injectors and short duration drug injection has a relationship with receptive needle sharing among IDUs (Parviz et al., 2005).

Some findings from this study reconfirmed previous conclusions that intervention programs influences needle sharing behaviors of IDU. For instance, receiving free needles and syringe (Ksobiech, 2003; Thanh et al., 2008; Bailey et al., 2002), and receiving peer educator support reduced needle sharing (Vazirian et al., 2005; Latkin et al., 2008). In Vietnam, purchasing or possessing syringes and needles is legal, but it becomes illegal if they are used to inject illicit drugs. As a result IDUs are reluctant to carry needles for fear of arrest. Police can arrest an IDU any time if they find a needle and syringe in the pocket of an IDU. A key component of the harm reduction intervention programs are the needle and syringe exchange program (NSP). Most IDU access syringes and needles at pharmacies instead of injecting “hot spots”, so it is very difficult to encourage IDUs to practice safe injection as clean needles are not available and injecting locations are not safe and convenient. Sharing injection equipment as needles are not available and drugs continue to be smuggled in is common. One needle may be shared by up to ten people or more, even among drug users who are known to be living with HIV (IHRD, 2009). Aside from that, there is a network of peer educators who deliver clean needles to IDUs and instruct them how to have safe injecting behavior. Without such a service it is very difficult for IDUs to undertake safe behavior if they did not receive support from peer educators. Providing counseling from peer educators also increased the safe injecting practices among IDU.

Nevertheless, some factors did not affect risk behavior. For example, marital status, knowledge of HIV, occupation and receiving HIV prevention information from mass media did not have an effect on needle sharing, despite the fact that there was a relationship confirmed by previous studies (Dalgard et al., 2009; Purcell et al., 2006; Parviz et al., 2005; Tran et al., 2006; Dung, 2007). The feasible reasons for these contradictions may be due to a small sample size (N = 338) in this study.

Based on the results of this study, it would be tremendous if clean needles and syringe were always available for IDUs to use any time and in injecting "hot spots". In addition, peer educator support networks should be provided and scaled up among IDUs programs. These activities are but a few recommendations that will assist in strengthening the harm reduction intervention programs

CHAPTER V
CONCLUSION AND RECOMMENDATION

5.1 Conclusion

This study determines factors affecting needle sharing among injecting drug users in Vietnam. Secondary data comes from "Final Evaluation of Preventing HIV in Vietnam" of Vietnam HIV/AIDS Prevention Project, during November 2008 to January 2009. Seven provinces including Ho Chi Minh, Hanoi, Quang Ninh, Hai Phong, Da Nang, Can Tho, and An Giang are used in this study. The dependent variable was needle and syringe sharing behavior in the previous six months at survey time. A total of eleven independent variables were chosen including socio-demographics characteristics (age, gender, education level, marital status, and occupation), personal factors (knowledge, perceived HIV status, injecting duration) and to access intervention program (receiving free needle and syringe, receiving peer educator support) and receiving HIV prevention information from mass media.

The major result in this study shows that IDU with every year in age increase were 10% less likely to share needles ($p<0.001$). Surprisingly, IDU who had completed secondary school are 2.6 times more likely to share needles than those who had primary education at 0.05 level. In addition, some personal factors were also associated with needle sharing behavior among IDUs. For example, IDU who perceived that they had a positive HIV status, were 4.6 times more likely to share needles than those with a negative perception or unknown HIV status at the 0.001 level. Durations of drug injection were positively associated with needle sharing and with a one year increase of injection were 11% less likely to share needles. However, knowledge on HIV was not significant with needle sharing behavior.

Access to HIV intervention program, the odds of sharing needles for IDUs who reported to receive free needles and syringe were 53% less likely to share needles

compared to those who did not receive free needles and syringe ($p<0.05$). For receiving peer educator support, there was a decreased probability of unsafe injecting behavior as IDU who received peer educator support were 76% less likely to share needles compared to those who did not receive ($p<0.001$).

5.2 Recommendation for intervention programs

1. The result of the research should be used to advocate policy makers and other stakeholders for better understanding towards the situation of IDU and provide a more effective and practical system of support for intervention programs to reduce the impacts of HIV/AIDS among IDU in Vietnam. For example, intervention programs should focus on young, male IDU and IDUs who have never accessed intervention programs. Facilitating the integration of state programs into a national program would increase the effectiveness of the entire program as a whole.

2. The intervention programs reduced the HIV risk behaviors of IDUs, therefore receiving clean needles and syringes, and receiving peer educator support were the main factors associated with this effect. The program should make sure the availability and accessibility of clean syringes and needles by strengthening activities to disseminate these products. Particularly, the needle and syringes exchange program should be promoted through various channels such as peer educators, commune health stations, pharmacies, and clubs. In doing this the intervention program should strengthen peer educator support. Peer educator support should be included with clean syringe and needles exchange along with personal counseling, care services and referrals for IDU.

3. It is known that IDU will be the target in any harm reduction intervention program and networks of peer educators are the main components in facilitating this, therefore efforts to establish networks of peer educators should be prioritized. The networks of peer educators are not only considered in quantity but also in quality, especially in counseling skill so that they can enhance their roles in providing harm reduction services efficiently.

4. It is important to strengthen activities of an M&E system from project to commune level to ensure that IDUs can access and use clean needles effectively in project sites as well as to integrate this project with the national HIV prevention program and other HIV projects.

5.3 Recommendation for further research

1. In this study, the sample size is small and the study could not demonstrate the relationship that they might wish to have with some factors. Therefore, it is necessary to include a larger sample sizes in future studies and will hopefully well represent IDU in Vietnam. A large sample size may increase the usefulness of logistic regression analysis and the results may be able to be applied.

2. Discover more information of IDUs (such as frequency of injection, income, alcohol use and smoking) that may be significantly related to the HIV status of IDUs in Vietnam.

3. It is necessary to conduct qualitative research to understand reasons why IDU still share needles and syringes although they have good knowledge of HIV/AIDS, received free needles/syringe and received peer educator support.

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APPENDIX

Some selected questions from the questionnaire that are used in this study:

Number	Questions	Answer coding
1	How old are you?	☐☐
2	Gender	1 = Male 2 = Female
3	What is your marital status?	1 = Single 2 = Married 3 = Divorced 4 = Separated 5 = Widowed
4	What is your highest education?	1 = Illiteracy 2 = Primary school 3 = Secondary school 4 = High school or higher
5	What is your job?	1 = Staff 2 = Worker 3 = Business 4 = Student 5 = Other 6 = Unemployed
6	Answer these question with your opinion: 1) Fidelity can reduce risk of HIV infection? 2) One can be infected with HIV if he/she has shared a toilet with someone who was HIV-positive, can't he/she? 3) Do you think that correct condom use can prevent HIV transmission during sexual intercourse? 4) Do you think that HIV can be transmitted through mosquito or insect biting? 5) Do you think that sharing syringe increases the risk of HIV infection? 6) Do you think that cleaning a contaminated syringe with water reduces the risk of HIV infection?	1) 1 = Yes; 2 = No 2) 1 = Yes; 2 = No 3) 1 = Yes; 2 = No 4) 1 = Yes; 2 = No 5) 1 = Yes; 2 = No 6) 1 = Yes; 2 = No

Number	Questions	Answer coding
	7) Do you think that abstinence from sexual intercourse can prevent HIV infection?	7) 1 = Yes; 2 = No
7	What do you think about your current HIV status?	1 = Negative 2 = Positive 3 = Unknown
8	Which year did you start to inject drug?	☐☐☐☐
9	During last 6 months, have you shared syringe with some ones?	1 = Yes 2 = No
10	During last 6 months, have you ever received free needles and syringes	1 = Yes 2 = No
11	During last 6 months, have you ever received any support from educators?	1 = Yes 2 = No
12	Have you ever received HIV prevention information during last 6 months?	1 = Yes 2 = No
13	What source of HIV prevention information have you received during last 6 months?	1 = Peer educator 2 = Health officer 3 = TV, radio, newspaper 4 = Club for health education 5 = Others…….....…

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