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Risk Factors for HIV Infection among Thai Young Men Aged 21-23 Years

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Abstract

Background: Young men are a highly susceptible group for HIV infection. This study aimed to identify HIV risk factors among Thai young men aged 21-23 years for appropriate preventive interventions.

Methods: A case control study was conducted among 240 HIV positive and 240 negative young men matched for residential areas, using a 6-part questionnaire booklet, consisting of demographic data, addictive behaviors, sexual behaviors, HIV/AIDS knowledge and attitude, condom knowledge, attitude and practice and psychosocial data. The SPSS version 10 software were used for data analysis.

Results: From univariate analysis, the significant risk factors were: urban housing area (OR=1.61); labor occupation (OR=1.70); income of more than 2000 Baht/month (OR=1.74); early secondary level of education and lower (OR=2.71); smoking (OR=2.46); alcohol use (OR=1.61); marijuana use (OR=4.57); amphetamine use (OR=3.44); heroin use (OR=9.32); alcohol use before sex (OR=1.74); drug use before sex (OR=3.76); IDU (OR=6.02); needle sharing (OR=5.80); first sex with female sex workers (FSWs) (OR=3.52); having more than 3 lifetime sex partners (OR=2.14); history of anal sex (OR=2.25); history of STDs (OR=2.80); HIV risk perception (OR=1.61); high speed driving preference (OR=2.73); unability of safe sex talk with partners (OR=1.78); unworrying about HIV (OR=2.28). From multiple logistic regression analysis, the variables found to be predictive of HIV positivity were: income of more than 2000 Baht/month (OR=1.94, 95% CI=1.13, 3.31); heroin use (OR=4.18, 95% CI=1.03, 16.89); drug use before sex (OR=2.20, 95 % CI=1.13, 4.29); first sex with FSWs (OR=3.47, 95 % CI=1.69, 7.13); HIV risk perception (OR=1.86, 95% CI=1.07, 3.25); unworrying about HIV (OR=1.88, 95% CI=1.16, 3.07).

Conclusions: The HIV risk factors can be used for intervention programs for HIV prevention and develop a risk assessment scale to indicate which young men are at-risk for HIV infection and should be educated or counseled to reduce their risks.

Keywords: Risk factors; HIV infection; Thai; Young men

Introduction

HIV/AIDS problem is one of the greatest challenges to global public health with variable patterns of transmission and impact among world regions [1]. Primary prevention through education which can result in decreased risk-taking behaviors, especially changes in sexual behavior and condoms use which can reduce HIV seroprevalence in high-risk populations, are the most effective methods of avoiding HIV [2]. It was recognized that HIV transmission was associated with multiple risk factors. A combination of biological, behavioral, and social factors may account for the influence of primary prevention on the HIV epidemic. HIV prevention measures can be focused on each of these factors and young people are a focus of the national AIDS program [3]. The first AIDS case in Thailand was diagnosed in 1984 [4]. It was estimated that there were nearly 520,000 people (ages 15-49) living with HIV and AIDS, Thailand has the highest adult HIV prevalence in the South East Asia region in 2010 [5]. Sexual behavior patterns within Thai society have been the most important contributions to the disease transmission [6]. Young men are a highly susceptible group for HIV infection. Typically, the young recruit on a weekend pass has both the time and motivation, particularly under the influence of peer pressure, to indulge in high-risk behaviors [7].

Thai army conscripts come from young Thai men aged 21-23 years, chosen by lottery system according to Thai laws from all 21 year old of Thai men to work in the military service, mostly in the Royal Thai Army (RTA). There are approximately 60,000 new conscripts every year to work for two years in the army, divided into two groups; the first group enters the army in May and the second in November. All of them have been tested for HIV in the first month of their entry since 1989 for readiness of the strong troops and appropriate work. The HIV infection rate in army conscripts have reflected the infection rate of young Thai men, since such information are derived from the HIV testing in the cohort of Thai men at age of 21-23 years. The infection rates tended increase from 0.5% to peak at 3.7% in 1993, and gradually declined [8]. The conscripts are considered to include in 3 high-risk groups of HIV infection according to their unique demographic characteristics, i.e. men, young people and mobile population. Among Thai army conscripts, there is a high rate of HIV risks [9-12]. The results from the 1996 sexual behavior survey of them showed that there is reduction in risk sexual behaviors, but the change was unsatisfactory because they still had high risk sexual behaviors [13] which meant that they might contract HIV.

Essentially, all new HIV infections can be prevented if people can be helped to make changes in sexual and drug use practices. Perhaps the most difficult area of HIV prevention lies in the area of behavior change. Biomedical based behavioral research has concentrated on special risk groups. From a behavioral public health perspective, those less researched and understood are the residual categories of people potentially "at risk" and young men are among them. A comprehensive behavior change intervention strategy must be designed to address specific target groups in which HIV is being transmitted [14], to take account of the stage and the progress of the epidemic. There is often a gap between knowledge and behavior, and it requires considerable assistance and support to change risky patterns. There are many studies that show the associations between risk factors and HIV infection. These risk factors are: low education level, not living with parents/wife, low economic status, HIV misconception, low perceived risk of HIV, smoking, substance use, risk taking behaviors (e.g. nonuse of seatbelt, helmet), early age at first sex, no condom use at first sex, having sex with female sexual workers (FSWs), having sex with men, multiple sex partners, history of STDs [15-19]. Other risk factors are condom misconception, low perceived benefit of condom [20,21]; substance use, alcohol use before sex [10,22-24]; low self-efficacy and other psychosocial factors [25,26]. Some experts claim that single marital status may associate with risk factors [27]. From those risk factors, the level of association with HIV infection can be studied for specific risk factors for more effective HIV prevention among young Thai men.

Methods

The association between risk factors and HIV serostatus was determined by using case control studies. The sample size was obtained from the formula:

$$n = (p_0q_0 + p_1q_1)\,(z_\alpha + z_\beta)^2 / (p_1 - p_0)^2$$

The sample size will be at least 38 conscripts for each risk factor. This study includes 6 risk factors. Then, the sample size is 38 × 6=228. The sample size should be 240 in each group.

The instrument was 6-part questionnaire. All items of the questionnaire were modified to dichotomous answers. It was pretested among 20 HIV positive and 40 HIV negative conscripts and revised before data collection, yielding a 6-part questionnaire booklet. It is composed of demographic factors (7 items), addictive behaviors (8 items), sexual behaviors (8 items), HIV/AIDS knowledge and attitude (8 items), condom knowledge, attitude and practice (4 items) and psychosocial factors (18 items). HIV testing was performed by using ELISA for screening and Western blot for confirmatory test. The results of HIV positive conscripts will be sent to the counselors.

240 HIV positive conscripts and 240 negative conscripts, matched for working in the same army units, were recruited as participants to complete a questionnaire booklet. Verbal consent was obtained and the trained HIV/AIDS counselors, working in the RTA hospitals, were responsible for data collection. Data collection was performed between 1999 and 2001. The complete data for analysis were obtained from 234 HIV negative and 203 HIV positive conscripts.

The crude Odds Ratio (OR) and the difference between groups were obtained by using the social science statistical software in univariate analysis. Then, the logistic regression was applied for controlling confounders and evaluating the effect of risk variables on HIV infection. The variables that were significant ($p<0.05$) and the corresponding p-values ($p<0.1$) were entered into the logistic regression model and the adjusted OR's of significant risk factors were obtained.

Results

The samples were 203 HIV positive conscripts and 234 HIV negative conscripts. The average age, marital status, residence, education, occupation before being conscripts were analysed (Table 1).

After univariate analysis, the significant association between risk factors and HIV infection included urban housing area, labor occupation, income of more than 2000 Baht/month, early secondary level of education and lower, smoking, alcohol use, marijuana use, amphetamine use, heroin use, alcohol use before sex, drug use before sex, first sex with FSWs, having more than 3 lifetime sex partners, history of anal sex, history of STDs, HIV risk perception, high speed driving preference, inability of safe sex talk with partners and unworrying about HIV (Tables 2-8).

Chracteristics	HIV+ n (%)	HIV- n (%)	Total n (%)
Number	203	234	437
Age (years)			
21-22	153 (75.4)	178 (76.1)	331 (75.7)
23 and over	50 (24.6)	56 (23.9)	106 (24.3)
Total	203 (100)	234 (100)	437 (100)
Mean	21.9 ± 1.2	21.9 ± 1.1	21.9 ± 1.1
Marital status			
Single	151 (75.5)	182 (78.4)	333 (77.1)
Married	22 (11.0)	37 (15.9)	59 (13.6)
Divorced	4 (2.0)	1 (0.4)	5 (1.2)
Widowed	7 (3.5)	1 (0.4)	8 (1.8)

Illegal wife*	16 (8.0)	1 (4.7)	27 (6.2)
Total	200 (100)	232 (100)	432 (100)
Native area			
North	41 (20.1)	55 (23.5)	96 (22.0)
Northeast	44 (21.6)	57 (24.4)	101 (23.1)
Central	69 (33.9)	72 (30.8)	141 (32.3)
South	49 (24.1)	50 (21.4)	99 (22.6)
Total	203 (100)	234 (100)	437 (100)
Education			
Elementary and lower	70 (34.6)	58 (24.9)	128 (29.4)
Early secondary	70 (34.6)	48 (20.6)	118 (27.1)
Late secondary	50 (24.8)	81 (34.8)	131 (30.1)
Vocational/subbachelor	8 (4.0)	35 (15.0)	43 (9.9)
Bachelor and higher	4 (2.0)	11 (4.7)	16 (3.7)
Total	202 (100)	233 (100)	435 (100)
*__Note:__ Illegal wife means the woman who lives with a man and behaves as wife and husband, but no legal registration.			

Table 1: Demographic characteristics of sample conscripts.

Characteristics	HIV+ n (%)	HIV- n (%)	Total n (%)
Housing area			
Urban	84 (45.2)	74 (33.8)	158 (39.0)
Rural	102 (54.8)	145 (66.2)	247 (61.0)
Total	186 (100)	219 (100)	405 (100)
Previous occupation			
None	4 (2.0)	3 (1.3)	7 (1.6)
Agriculture	42 (21.0)	53 (23.1)	95 (22.1)
Fisherman	3 (1.5)	3 (1.3)	6 (1.4)
Government officials	2 (1.0)	1 (0.4)	3 (0.7)
Private organization	34 (17.0)	35 (15.3)	69 (16.1)
Laborers	70 (35.0)	55 (24.0)	125 (29.1)
Students	34 (17.0)	67 (29.2)	101 (23.5)
Commerce	10 (5.0)	12 (5.2)	22 (5.1)
Sex workers	1 (0.5)	-	1 (0.2)
Total	200 (100)	229 (100)	429 (100)
Monthly income			
1,000 B and less	40 (20.1)	74 (32.0)	114 (26.5)

1,001-2,000	7 (3.5)	13 (5.6)	20 (4.6)
2,001-3,000	24 (12.1)	26 (11.2)	50 (11.6)
3,001-4,000	40 (20.1)	29 (12.6)	69 (16.0)
4.001-5,000	39 (19.6)	32 (13.8)	71 (16.5)
5,001 and over	49 (24.6)	57 (24.7)	106 (24.6)
Total	199 (100)	231 (100)	430 (100)

Table 2: Demographic characteristics of sample conscripts (continued).

	HIV+ n (%)	**HIV- n (%)**	**Crude OR (95% CI)**	**p-value**
N	203	234		
Age (Mean)	21.9	21.9		
Single marital status				
Yes	151 (74.4)	182 (77.8)	0.83 (0.52, 1.32)	0.47
No	52 (25.6)	52 (22.2)	1.00	
Total	203 (100)	234 (100)		
Urban housing area				
Yes	84 (45.2)	74 (33.8)	1.61 (1.06, 2.44)	0.01
No	102 (54.8)	145 (66.2)	1.00	
Total	186 (100)	219 (100)		
Early secondary education or lower				
Yes	140 (69.3)	106 (45.5)	2.71 (1.78, 4.11)	0.000
No	62 (30.7)	127 (54.5)	1.00	
Total	202 (100)	233 (100)		
Labor occupation				
Yes	70 (34.5)	55 (23.5)	1.71 (1.10, 2.67)	0.015
No	133 (65.5)	179 (76.5)	1.00	
Total	203 (100)	234 (100)		
Monthly income 2,000 Baht and above				
Yes	152 (76.4)	144 (62.3)	1.74 (1.16, 2.61)	0.005
No	47 (23.6)	87 (37.7)	1.00	
Total	199 (100)	231 (100)		
Mostly not living with parents/wife				
Yes	36 (17.7)	52 (22.2)	0.75 (0.45, 1.24)	0.29
No	167 (82.3)	182 (77.8)	1.00	
Total	203 (100)	234 (100)		

Table 3: Comparison of demographic characteristics of HIV+ and HIV- conscripts.

Variables	HIV+ n(%)	HIV- n(%)	Crude OR (95% CI)	p-value
N	203	234		
Smoking				
Yes	129 (63.5)	97 (41.4)	2.46 (1.49, 4.26)	0
No	74 (36.4)	137 (58.5)	1	
Total	203 (100)	234 (100)		
Alcohol use				
Yes	101 (49.8)	89 (38.0)	1.61 (1.08, 2.41)	0.009
No	102 (50.2)	145 (62.0)	1	
Total	203 (100)	234 (100)		
Marijuana use				
Yes	15 (7.4)	4 (1.7)	4.57 (1.43, 19.25)	0.003
No	188 (92.6)	230 (98.3)	1	
Total	203 (100)	234 (100)		
Amphetamine use				
Yes	27 (13.3)	10 (4.3)	3.44 (1.53, 7.88)	0.001
No	176 (86.7)	224 (95.7)	1	
Total	203 (100)	234 (100)		
Heroin use				
Yes	22 (10.8)	3 (1.3)	9.32 (2.74, 49.39)	0
No	181 (89.2)	231 (98.7)	1	
Total	203 (100)	234 (100)		
Thinner use				
Yes	8 (3.9)	7 (3.0)	1.33 (0.43, 4.20)	0.38
No	195 (96.1)	227 (97.0)	1	
Total	203 (100)	234 (100)		
Alcohol use before sex				
Yes	136 (67.0)	126 (53.8)	1.74 (1.15,2.63)	0.003
No	67 (33.0)	108 (46.2)	1	
Total	203 (100)	234 (100)		
Use drug before sex				
Yes	61 (30.0)	24 (10.3)	3.76 (2.16, 6.56)	0
No	142 (70.0)	210 (89.7)	1	
Total	203 (100)	234 (100)		

Table 4: Comparison of addictive behaviors between HIV+ and HIV- conscripts.

Variables	HIV+ n (%)	HIV- n (%)	Crude OR (95% CI)	p-value
N	203	234		
First sex with FSWs				
Yes	46 (22.7)	18 (7.7)	3.52 (1.89, 6.61)	0
No	157 (77.3)	216 (92.3)	1	
Total	203 (100)	234 (100)		
Nonuse condom in first sex				
Yes	113 (55.7)	140 (59.8)	0.84 (0.56, 1.26)	0.43
No	90 (44.3)	94 (40.2)	1	
Total	203 (100)	234 (100)		
Had sex with FSWs last year				
Yes	27 (13.3)	15 (6.4)	2.24 (1.10, 4.60)	0.02
No	176 (86.7)	219 (93.6)	1	
Total	203 (100)	234 (100)		
Nonuse condom last time with non-wife				
Yes	68 (33.5)	64 (27.4)	1.34 (0.87, 2.06)	0.19
No	135 (66.5)	170 (72.6)	1	
Total	203 (100)	234 (100)		
More than 3 lifetime sexual partners				
Yes	100 (49.3)	74 (31.6)	2.10 (1.39, 3.17)	0.0002
No	103 (50.7)	160 (68.4)	1	
Total	203 (100)	234 (100)		
Ever had sex with men				
Yes	13 (6.4)	6 (2.6)	2.59 (0.90, 8.49)	0.08
No	190 (93.6)	228 (97.4)	1	
Total	203 (100)	234 (100)		
Had anal intercourse				
Yes	22 (11.1)	12 (5.2)	2.25 (1.02, 5.01)	0.04
No	177 (88.9)	217 (94.8)	1	
Total	199 (100)	229 (100)		
Ever had STDs				
Yes	42 (21.1)	21 (9.1)	2.66 (1.46, 4.89)	0.001
No	157 (78.9)	209 (90.9)	1	
Total	199 (100)	230 (100)		

Table 5: Comparison of sexual behaviors between HIV+ and HIV- conscripts.

Variables	HIV+ n (%)	HIV- n (%)	Crude OR (95% CI)	p-value
N	203	234		
You can be infected with HIV by traveling with HIV-infected persons.				
Incorrect	56 (27.6)	48 (20.5)	0.68 (0.42, 1.08)	0.11
Correct	147 (72.4)	186 (79.5)	1	
Total	203 (100)	234 (100)		
The mosquito can carry HIV to infect you by biting.				
Incorrect	159 (78.3)	184 (78.6)	0.98 (0.60, 1.60)	0.97
Correct	44 (21.7)	50 (21.4)	1	
Total	203 (100)	234 (100)		
You can be infected with HIV by using the same toilet with HIV-infected person.				
Incorrect	166 (81.8)	188 (80.3)	1.10 (0.66, 1.83)	0.79
Correct	37 (18.2)	46 (19.7)	1	
Total	203 (100)	234 (100)		
In the present time, AIDS can be completely cured.				
Incorrect	133 (65.5)	159 (67.9)	0.90 (0.59, 1.37)	0.66
Correct	70 (34.5)	75 (32.1)	1	
Total	203 (100)	234 (100)		
Good-looking woman cannot be HIV-infected person.				
Incorrect	132 (65.0)	151 (64.5)	1.02 (0.67, 1.55)	0.99
Correct	71 (35.0)	83 (35.5)	1	
Total	203 (100)	234 (100)		
Homosexual men are not only one group that are HIV risky.				
Incorrect	115 (56.7)	162 (69.2)	1.72 (1.14, 2.66)	0.008
Correct	88 (43.3)	72 (30.8)	1	
Total	203 (100)	234 (100)		
AIDS can happen to me.				
Yes	150 (73.9)	149 (63.7)	1.61 (1.04, 2.50)	0.02
No	53 (26.1)	85 (36.3)	1	
Total	203 (100)	234 (100)		

Table 6: Comparison of knowledge and attitude of HIV/AIDS between HIV+ and HIV- conscripts.

Variables	HIV+ n (%)	HIV- n (%)	Crude OR (95% CI)	p-value
N	203	234		
Do you think putting a condom on penis would interrupt sex?				
Yes	129 (63.5)	156 (66.7)	0.87 (0.57, 1.32)	0.56

No	74 (36.5)	78 (33.3)	1	
Total	203 (100)	234 (100)		
Have you ever talked with your friends or else about condom?				
No	34 (16.8)	28 (12.1)	1.47 (0.83, 2.63)	0.2
Yes	168 (83.2)	204 (87.9)	1	
Total	202 (100)	232 (100)		
When you had sex with nonsteady partner in the last 12 months, did you use condom?				
No	114 (56.2)	115 (49.1)	1.33 (0.89, 1.97)	0.17
Yes	89 (43.8)	119 (50.9)	1	
Total	203 (100)	234 (100)		
Do you think most of your friends use condoms when having sex with nonsteady partner?				
No	99 (49.7)	116 (50.4)	1.02 (0.69, 1.52)	0.98
Yes	100 (50.3)	114 (49.6)	1	
Total	199 (100)	230 (100)		

Table 7: Comparison of knowledge, attitude and practice of condoms between HIV+ and HIV- conscripts.

Variables	HIV+ n (%)	HIV- n (%)	Crude OR (95% CI)	p-value
N	203	234		
I do things my own way, irrespective of what my friends think.				
Yes	34 (16.7)	39 (16.7)	1.01 (0.59, 1.72)	0.91
No	169 (83.3)	195 (83.3)	1	
Total	203 (100)	234 (100)		
If I do not have sex with lots of lovers, I would feel unattractive.				
Yes	39 (19.2)	36 (15.4)	1.71 (0.77, 2.23)	0.35
No	164 (80.8)	198 (84.6)	1	
Total	203 (100)	234 (100)		
I do not worried about contracting HIV.				
Yes	110 (54.2)	80 (34.2)	2.28 (1.51, 3.43)	0
No	93 (45.8)	154 (65.8)	1	
Total	203 (100)	234 (100)		
I believe it is possible for me to practice safer sex.				
No	39 (19.2)	32 (13.7)	1.50 (0.87, 2.59)	0.15
Yes	164 (80.8)	202 (86.3)	1	
Total	203 (100)	234 (100)		
If a condom is not available, it would be worth the effort to discontinue sexual activity to obtain a condom.				
No	25 (12.3)	18 (7.7)	1.69 (0.85, 3.36)	0.14

Yes	178 (87.7)	216 (92.3)	1	
Total	203 (100)	234 (100)		
You worry every time you meet the strangers.				
Yes	12 (5.9)	12 (5.1)	1.16 (0.47, 2.86)	0.88
No	191 (94.1)	222 (94.9)	1	
Total	203 (100)	234 (100)		
When you are asked to do something, you are always anxious.				
Yes	23 (11.3)	16 (6.8)	1.74 (0.85, 3.60)	0.14
No	180 (88.7)	218 (93.2)	1	
Total	203 (100)	234 (100)		
You are easily angry when you face disappointed situation.				
Yes	58 (28.6)	61 (26.1)	1.13 (0.73, 1.77)	0.63
No	145 (71.4)	173 (73.9)	1	
Total	203 (100)	234 (100)		
You like driving a car or riding a motorcycle with high velocity.				
Yes	115 (68.5)	178 (85.6)	2.73 (1.60, 4.70)	0.0001
No	53 (31.5)	30 (12.8)	1	
Total	168 (100)	234 (100)		
When you drive car/ride motorcycle, do you often use seatbelt/helmet				
Yes	35 (17.2)	46 (19.7)	0.85 (0.51, 1.43)	0.6
No	168 (82.8	188 (80.3	1	
Total	203 (100)	234 (100)		
Did you feel as if your life had been a failure?				
Yes	41 (20.6)	35 (15.1	1.46 (0.86, 2.49)	0.17
No	158 (79.4)	197 (84.9)	1	
Total	199 (100)	232 (100)		
You cannot sleep well.				
Yes	50 (25.0)	61 (26.2)	0.94 (0.59, 1.49)	0.86
No	150 (75.0)	172 (73.8)	1	
Total	200 (100)	233 (100)		
Did you feel lonely?				
Yes	73 (36.5)	72 (30.9)	1.24 (0.84, 1.96)	0.26
No	127 (63.5)	161 (69.1)	1	
Total	200 (100)	233 (100)		
Would you be able to refuse sex if your partner did not want you to use condom?				
Yes	84 (41.4)	103 (44.0)	0.90 (0.60, 1.34)	0.64

No	119 (58.6)	131 (66.0)	1	
Total	203 (100)	234 (100)		
Can you stop and look for condom even if you are sexually aroused?				
Yes	50 (24.6)	52 (22.2)	1.14 (0.71, 1.83)	0.63
No	153 (75.4)	182 (77.8)	1	
Total	203 (100)	234 (100)		
Would you use condoms even if you had been drinking or using drugs?				
Yes	70 (34.5)	65 (27.8)	1.37 (0.89, 2.11)	0.15
No	133 (65.5)	169 (72.2)	1	
Total	203 (100)	234 (100)		
Do you think you will use condom when having sex with your nonsteady partners?				
Yes	35 (17.2)	32 (13.7)	1.32 (0.75, 2.30)	0.36
No	168 (82.8)	202 (86.3)	1	
Total	203 (100)	234 (100)		
Are you sure you can talk about safe sex with your sexual partner?				
Yes	88 (44.2)	71 (30.9)	1.78 (1.17, 2.69)	0.006
No	111 (55.8)	159 (69.1)	1	
Total	199 (100)	230 (100)		

Table 8: Comparison of psychosocial characteristics between HIV+ and HIV conscripts.

Risk Factors	Crude OR	95% CI	p value
Urban housing area	1.61	1.06, 2.41	0.013
Labor occupation	1.7	1.10, 2.64	0.01
Income >2000 Baht/month	1.74	1.16, 2.61	0.002
Early secondary education and lower	2.71	1.78, 4.11	0
Smoking	2.46	1.49, 4.26	0
Alcohol use	1.61	1.08, 2.41	0.009
Marijuana use	4.57	1.43, 19.25	0.003
Amphetamine use	3.44	1.53, 7.88	0.001
Heroin use	9.32	2.74, 49.39	0
Alcohol before sex	1.74	1.15, 2.63	0.003
Drug use before sex	3.76	2.16, 6.56	0
First sex with FSWs	3.52	1.89, 6.61	0
More than 3 sex partners	2.14	1.44, 3.17	0.0003
History of anal sex	2.25	1.12, 4.71	0.03
History of STDs	2.8	1.60, 5.02	0.0004

HIV risk perception	1.61	1.04, 2.50	0
High speed driving preference	2.73	1.60, 4.70	0.001
Unability of safe sex talk with partner	1.78	1.17, 2.69	0.006
Unworrying about HIV	2.28	1.51, 3.43	0

Table 9: Summary of risk factors for HIV infection among Thai army conscripts from univariate analysis.

Variables	β	SE	Wald	OR	95% CI	Sig
Income (>2000 *vs.* others)	0.661	0.2739	5.8235	1.94	(1.13, 3.31)	0.0158
Heroin use (yes *vs.* no)	1.4299	0.7127	4.0254	4.18	(1.03,16.89)	0.0448
Drug use before sex (yes *vs.* no)	0.79	0.34	5.3969	2.2	(1.13, 4.29)	0.0202
First sex with FSWs (yes *vs.* no)	1.2434	0.3676	11.4433	3.47	(1.69, 7.13)	0.0007
HIV risk perception (yes *vs.* no)	0.6248	0.2833	4.8635	1.86	(1.07, 3.25)	0.0274
Unworry about HIV (yes *vs.* no)	0.6331	0.2489	6.4685	1.88	(1.16, 3.07)	0.011

Table 10: Logistic equation based on the data in phase 1.

Risk Factors	Adjusted OR	95% CI
Income more than 2000 Baht/month	1.94	1.13, 3.31
Heroin use	4.18	1.03, 16.89
Drug use before sex	2.2	1.13, 4.29
First sex with FSWs	3.47	1.69, 7.13
HIV risk perception	1.86	1.07, 3.25
Unworrying about HIV	1.88	1.16, 3.07

Table 11: Risk factors for HIV infection among Thai army conscripts from multivariate logistic regression analysis.

After multivariate analysis was applied, 6 variables were found to be related to HIV infection: (1) income of more than 2000 Baht/month (OR=1.94), (2) heroin use (OR=4.18), (3) drug use before sex (OR=2.20), (4) first sex with FSWs (OR=3.47), (5) perception of HIV risk (OR=1.86), and (6) unworrying about HIV (OR=1.88) (Tables 9-11).

Discussion

This study demonstrated 6 significant risk factors for HIV infection among Thai army conscripts: (1) income of more than 2000 Baht/month (demographic factor), (2) heroin use (addictive behavior), (3) drug use before sex (addictive behavior and sexual behavior), (4) first sex with FSWs (sexual behavior), (5) perception of HIV risk (attitude to HIV and psychosocial factor), and (6) unworrying about HIV (attitude to HIV and psychosocial factor).

It should be noted that almost all of the 6 risk factors of this study are related to behavior, i.e. addictive behavior, sexual behavior and psychosocial behavior. Psychosocial behavior played a role in the control of addictive and sexual behaviors. Addictive behavior could also influence psychosocial and sexual behaviors to take HIV risks.

In this study, most of the risk factors obtained from the logistic regression analysis are behavioral factors of hosts or conscripts, i.e. addictive behavior, sexual behavior and psychological behavior. Only income more than 2,000 Baht/month is not directly risk behavior but it is indirectly related to risk behavior.

The income of 2000 Baht/month or over was found to significantly associate with HIV infection. The reasons may be that the more money the subjects had, the more occasions they could buy alcohol, drugs and sex, which facilitated HIV transmission.

The use of heroin was the strongest predictor of HIV infection in this study. The reason is people who use heroin usually inject it and share syringes or needles, which may be contaminated with HIV22, [28].

Alcohol and other drug use are risk-taking behaviors for HIV because mood-altering drugs can impair judgment and lead to risky behavior. In other words, when someone uses drugs, such as marijuana, amphetamine, before having sex, they may forget safe sex and can contract HIV [29].

The sexual behavior of first sexual intercourse was related to protective behavior in the later behavior. A study showed that youths who used a condom from the onset of sexual activity were more likely to have used a condom in the most recent intercourse occasion, less likely to be diagnosed with a STD and less likely to combine substance use with sexual activity [30]. This is the clue for HIV prevention.

It was demonstrated that the conscripts who perceived the risk of HIV were more likely to be HIV positive. The Health Belief Model theory can be used to explain the association. These basic components include subjective perceptions of: (1) vulnerability to the negative event, (2) severity of the negative event, (3) benefits of specific preventive actions, and (4) barriers to performing preventive actions. Perceived personal vulnerability is usually depicted as a necessary (but not sufficient) motivator of precautionary behavior. In addition, emotionality may influence person's perception of threat. Risk

perception is not enough for a person to practice preventive behaviors [31]. HIV risk perception is also demonstrated to be unrelated to injecting or sexual behaviors and previous history of STDs [28]. Focus group discussions revealed that the risk perception for acquiring HIV was decreased by never knowing a person with HIV, because FSWs had health certificates for STD-free, and by the belief that HIV/AIDS could be cured or prevented with folk medicines [32]. This made some conscripts underestimate the risk of HIV infection, remain unconcerned about HIV/AIDS and perform HIV- related risk behavior.

Many studies showed that some but not all beliefs about HIV have changed over time. In 1986, the survey revealed that 46% of people worried about becoming infected with HIV and 9% thought it likely they will get AIDS in their lifetime. In 1988, the proportion of respondents doubled who indicated that they were worried about AIDS (74%) and who thought it likely they will get AIDS in their lifetime (18%). There has been significant increase in the perceived likelihood of sexual transmission from 1988 to 1991 [33]. Adolescents' worry of STDs and HIV had different sets of correlates. Recent history of STDs was associated with HIV worry and partner-specific barriers were related to HIV worry [34]. Unworrying about HIV/AIDS may make the conscripts careless and engage in drug use and unprotected sexual behaviors.

Surprisingly, in this study, nonuse of condom both in first sex and last time with FSWs did not associate significantly with HIV infection. It was the same as the study in the north of Thailand [16] that showed no protective effect of condom use in commercial sex. This is understandable in the context of condom promotion and changing condom use patterns. The men at highest risk may have been the first to adopt condom use. However, with the rapid spread of HIV, many were unknowingly infected before making any behavioral change. In addition, some may have been less than consistent in their condom use at first. This would make condom in the early stages of the epidemic a proxy for risk behavior, explaining the higher HIV levels in those reporting condom uses. However, the use of latex condom is accepted to reduce the risks of STDs, including HIV. In this study, some risk factors were associated with inconsistent condom use that can lead to HIV infection, i.e. drug use before sex and unworrying about HIV.

Some risk factors in this study were significantly associated with HIV infection by univariate analysis but not significantly related after multiple logistic regression analysis. For example, the demographic characteristics that significantly associated with HIV infection only in univariate analysis were urban housing area, labor occupation and finishing early secondary school or lower. For residential areas, it should be noted that the conscripts are not in their natural social environment during military service, since they are living in military camps with only occasional home visits.

Addictive behaviors significantly associated with HIV infection in univariate analysis were smoking, alcohol use, marijuana use, and amphetamine use, alcohol use before sex, IDUs, heroin use, and drug use before sex. Only the last 2 variables were demonstrated to associate with HIV infection in multivariate analysis.

Considering sexual behaviors and related factors, the history of STDs was significantly associated with HIV infection in univariate analysis; this was compatible with other studies [16,18,35] but it was not in multivariate analysis. The history of having sex with men and anal sex are associated with HIV infection in univariate analysis; this was the same as in another study [18], but it was not in multivariate analysis. Having sex with FSWs in the previous year and more than [3] lifetime sex partners were also significantly related to HIV infection in univariate analysis. In many studies, visiting FSWs is the most important factor influencing new HIV infections [18,36].

This study showed that there was no statistical difference concerning the knowledge of HIV/AIDS and condom use between conscripts with different HIV serostatus. There were a lot of studies that showed this fact, such as the study in sexually active Thai men in 1989 which showed that more than 90% possessed knowledge about HIV transmission modes, but only one-third to half of them had ever used a condom [37]. There are a number of reasons why knowledge may have had a limited effect on behavior change. Firstly, where knowledge is universally high there may be insufficient variance to produce statistically significant relationships with other variables, such as change in HIV/AIDS related risk behavior. Secondly, an alternative theoretical explanation is that knowledge only predicts stages in the process of behavior change but not behavior change itself. For example, the precaution adoption model consists of five stages: (1) unaware of the issue; (2) aware of the issue and personally engaged; (3) engaged and deciding what to do; (4) planning to act and not yet having acted; and (5) acting. The provision of information affects decision- making only in the first two stages. Thus the lack of consistent effects due to knowledge may be due to the selection of the wrong outcome variables. Finally, the failure of increased HIV/AIDS knowledge to facilitate appropriate changes in behavior may be due to the type of information provided or the characteristics of the person who perceives it [38].

However, the Thai HIV epidemic has not been static, it has evolved. The behavioral risk factors of young Thai men have been changed over time [39]. As the impact contribution of direct commercial sex was reduced by the country's efforts, other modes of transmission assumed more visibility and importance. Husband-wife transmission became the dominant route of infection for women. As brothels were increasingly perceived as high risk, commercial sex shifted to indirect sites, many of which were more difficult to identify than brothels. Feelings of safety by the clients at these sites reduced the pressure to use condoms.

There are a lot of research questions in order to change HIV risk behaviors among heterosexual adolescents, such as, whether risk reduction behavioral skills can be increased, whether intervention-induced behavioral change can be sustained, whether the behavior of high-risk populations can be changed and which kinds of interventions are most effective. It is concluded that carefully designed theory-based interventions that take into account the characteristics of the particular population or culture can cause positive changes in adolescents' HIV-risk behavior, but boundary conditions for their effectiveness still need to be identified [40].

Conclusions

The objective of this study is to identify HIV risk factors in the group of Thai army conscripts which represent Thai young men. There were 19 risk factors from univariate analysis. After removing of confounders by multiple logistic regression, the obtained risk factors were: income more than 2000 Baht/month, heroin use, drug use before sex, first sex with FSWs, perception of HIV risk, and unworrying about HIV.

From these risk factors, the targeted intervention by risk assessment can be implemented and the HIV risk assessment scale can be

developed to identify at-risk individuals for appropriate HIV preventive programs in this special group.

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