

FACTORS ASSOCIATED WITH ACCESS TO ANTIRETROVIRAL THERAPY AMONG PEOPLE LIVING WITH HIV IN VIENTIANE CAPITAL, LAO PDR

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ABSTRACT

Since 2001, antiretroviral therapy (ART) has been available for people living with HIV (PLHIV) in Lao People's Democratic Republic (PDR). Over 10 years of the ART program many HIV patients were found with advanced-stage AIDS in health care service facilities. This study aimed to examine factors associated with delayed access to ART among PLHIV in the capital of Vientiane. A cross-sectional study was conducted with 283 respondents (131 males and 152 females) aged 15 years or over. In this study, delayed access to ART was defined by a CD4 cell count of less than 350 cells/mm³ at the first screening, or those who presented with advanced AIDS-related symptoms. The odds ratios (ORs) and 95% confidence intervals (CIs) were estimated by a logistic model. After adjustment, young people (OR=2.17; 95% CI: 1.00–4.68; $p=0.049$), low education (OR=0.23; 95% CI: 0.10–0.55; $p=0.001$) and duration between risk behavior and HIV test (OR=3.83; 95% CI: 1.22–12.00; $p=0.021$) were significantly associated with delayed access to ART. Low perception of high risk behaviors was one of the obstacles leading to delayed testing and inability to access ART. Almost all reported feeling self-stigma, and only 30.5% of men and 23.7% of women disclosed the HIV status to his/her partner/spouse. In conclusion, delayed access to ART was associated with individual factors and exposure to health care facility. In order to improve early detection HIV infection following access to ART, an improvement in perceptual knowledge of HIV, as well as reduction of HIV/AIDS-related stigma, might be needed.

Key Words: Antiretroviral therapy, delayed access, PLHIV, self-stigma, Lao PDR.

INTRODUCTION

The introduction of highly active antiretroviral therapy (HAART) has substantially improved quality of life and reduced mortality for many HIV-infected people. It has become a cost-effective intervention, as it makes HIV infection a manageable chronic disease, allowing HIV-infected people to live well and to be socially and economically active.^{1, 2)} Since 2001, an antiretroviral therapy (ART) program to offer free prophylaxis and treatment has been promoted and scaled up nationwide in Lao PDR. Over 10 years of the ART program in Laos found many HIV patients

Received: July 24, 2014; accepted: August 8, 2014

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with an advanced stage of AIDS, indicating the importance of extending treatment coverage and promoting early access to the ART program.³ By the end of 2013, there were 6,239 cases of HIV reported to the AIDS registry. A total of 2,787 adults and children living with HIV had received ART, who were 58.3% of the estimated total of people living with HIV (PLHIV) eligible for ART, slightly higher than that in 2012 (55.4%).⁴ The Center for HIV/AIDS and STI (CHAS) estimates there will be 12,291 PLHIV in 2015.⁴ A national target was set to reach over 90% of these HIV-infected adults and children who are in need of ART.⁵ It was reported that among patients with the advanced stage those under ART at diagnosis had a lower mortality than those without ART at diagnosis.^{3, 6, 7} Therefore, designing interventions to improve ART coverage has been challenging.

Many studies have described factors associated with ART access, including demographic characteristics of patients. A few studies in rural Uganda and urban Zambia have shown that there was relatively low uptake of ART services among women, young people and married people with a high HIV prevalence.^{6, 8} Lower levels of socioeconomic conditions, education, and income were factors strongly associated with reduced access to health care services.^{9, 10} In addition, people have masked their desire for HIV testing because of the associated stigma, leading to suboptimal health services.¹¹ A study of stigma index in Lao PDR has shown that most of HIV-positive had fears of HIV status disclosure, possibly resulting in divorce/ rejection by spouses, or social disapproval. Many also feared stigmatization due to the appearance of AIDS symptoms, which may be seen as “marks of disgrace”. Taking medication for life caused them to feel stress, shame, and guilt.¹² Accordingly, HIV-positive individuals may refuse disclosure, treatment, or safer behaviors for fear of raising suspicions in their community.¹²⁻¹⁴

Information on ART access and uptake is very important in planning comprehensive HIV care services and achieving universal access. This study aimed to examine factors associated with delayed access to ART. This study would facilitate and provide information to policy makers and others involved with HIV/AIDS who should be aware of barriers for PLHIV and factors affecting ART access in this context. It further supports an HIV strategy and intervention program to increase ART coverage for PLHIV in Lao PDR.

MATERIALS AND METHODS

This study was conducted at Setthathirath Hospital and Mahosot Hospital, tertiary health facilities providing free ART for HIV patients in Vientiane, the capital of Lao PDR. Data were collected from September 1st to 28th, 2013. The study subjects were 283 HIV-positive patients; none rejected participation. They were aged 15 years or over and receiving ART. The data were collected by face-to-face interviews with a questionnaire. Information on WHO clinical staging and CD4 cell counts was collected from medical records. Delayed access to ART was defined by a CD4 cell count less than 350 cells/mm³ at the first screening at one of four ART service centers. In cases where a CD4 count was not available, WHO clinical stage III or IV (advanced stages with AIDS-related symptoms) were defined as delayed access to ART and included in the analysis.

Chi-square tests were used to examine the differences in the categorical data. A logistic regression model was applied to estimate odd ratios (ORs) and 95% confidence intervals (CIs) of factors for the delayed access to ART. The data were analyzed using IBM SPSS version 19.0.

The study was undertaken as a part of national survey of CHAS, Ministry of Health. The study protocol was approved by director of CHAS, after the national survey was approved by the National Ethics Committee for Health Research (NECHR).

RESULTS

Socio-demographics

More than half (53.7%) were women (Table 1). 34.4% of men and 46.1% of women were aged 25 to 34 years at the time of interview, and half of them (54.4%) were married. The proportion of divorced or widowed respondents was higher among women (15.1% and 14.5%, respectively) than among men (12.2% and 11.5%, respectively). Educational level was higher in men than in women; 21.4% of men and 35.5% of women had not completed secondary school. More than a quarter (26.9%) were unemployed, particularly for women (35.5%) including housewives. More men (27.5%) were labor/migrant workers than women (9.9%), and similarly full time employees (e.g. official workers in government or private sectors) were a higher proportion of men (26.7%) compared to women (15.1%). Most respondents (78.8%) were diagnosed in the central hospitals located in Vientiane. One hundred and ninety-two (67.8%) respondents had at least one child, and 40 respondents of those (20.8%) had at least one child living with HIV, while 14 respondents (7.3%) had untested children.

Table 1 Socio-demographic characteristics of respondents.

	Men (n=131)		Women (n=152)		Total (n=283)	
	n	(%)	n	(%)	n	(%)
Age at survey	Median: 34 (Min: 18, Max: 63)					
<25 years	6	(4.5)	24	(15.8)	30	(10.6)
25–34 years	45	(34.4)	70	(46.1)	115	(40.7)
35–44 years	44	(33.6)	37	(24.3)	81	(28.6)
≥45 years	36	(27.5)	21	(13.8)	57	(20.1)
Marital status						
Single	30	(22.9)	23	(15.1)	53	(18.7)
Married	70	(53.4)	84	(55.3)	154	(54.4)
Divorced or separated	16	(12.2)	23	(15.1)	39	(13.8)
Widowed	15	(11.5)	22	(14.5)	37	(13.1)
Education level						
None	2	(1.5)	2	(1.3)	4	(1.4)
Primary school	26	(19.9)	52	(34.2)	78	(27.6)
Secondary school	35	(26.7)	46	(30.3)	81	(28.6)
High school	43	(32.8)	29	(19.1)	72	(25.4)
College or higher	25	(19.1)	23	(15.1)	48	(17.0)
Occupation						
Unemployed, including housewife	22	(16.8)	54	(35.5)	76	(26.9)
Farmer	16	(12.2)	22	(14.5)	38	(13.4)
Labor/migrant workers	36	(27.5)	15	(9.9)	51	(18.0)
Self-employed	22	(16.8)	38	(25.0)	60	(21.2)
Full-time employees	35	(26.7)	23	(15.1)	58	(20.5)

Location of first HIV diagnosis						
Central hospital	103	(78.6)	120	(78.9)	223	(78.8)
Provincial hospital	6	(4.6)	8	(5.3)	14	(4.9)
District hospital	4	(3.1)	4	(2.6)	8	(2.8)
Drop-in center*	1	(0.8)	4	(2.6)	5	(1.8)
Outside country (Thailand)	17	(13.0)	16	(10.5)	33	(11.7)
Infection of child (n=192)						
Not infected	70	(79.6)	68	(65.4)	138	(71.9)
Infected (at least 1 child)	14	(15.9)	26	(25.0)	40	(20.8)
Not tested	4	(4.5)	10	(9.6)	14	(7.3)

* Drop-in center: one stop shop for key affected population (e.g. female sex workers, and men who have sex with men) to access needed HIV interventions including free HIV rapid testing and referrals to HIV care and treatment.

Health seeking behaviors for HIV testing and ART according to gender

Table 2 shows age at diagnosis and the behaviors regarding HIV testing and ART. There was a statistically significant difference in the age at diagnosis between men and women ($p=0.006$). The percentage of those diagnosed before 25 years of age was 11.6% in men and 29.1% in women. The main reason for HIV testing were also significantly different between genders ($p < 0.001$); severe sickness was 68.7% in men and 48.0% in women, while HIV infection or AIDS-related death of their spouse or child was found to be higher in women (26.3%) than in men (14.5%). Women (8.6%) were more likely to be transferred for HIV testing due to a diagnosed infection of sexual transmitted diseases (STD) than men (3.1%). Although not common for both genders, voluntary HIV testing after risky behaviors was lower in women (2.6%) compared to men (9.2%). Social reasons, including blood donation, worksite health check-up, job application, or going abroad, were rare.

There was a statistically significant difference between genders related to the duration between diagnosis and seeking of ART; access to ART within one month after diagnosis was found to be slightly higher in women (89.5%) than in men (80.9%). Low CD4 cell count (<200 cells/mm³) consistently showed a high proportion in men (48.9%) compared to women (35.5%). There was no significant difference between genders in terms of main reasons for delayed ART access after diagnosis. Regarding reasons, feeling healthy with no AIDS-related symptoms was found to be higher in men (38.5%) than in women (13.3%) among 41 respondents, while self depression (stress, shame and guilt) and no knowledge on ART service facility were higher among women (46.7% and 40.0%, respectively) than among men (23.0% and 38.5%, respectively).

HIV disclosure and stigma experienced according to gender

Table 3 shows HIV disclosure and stigma experiences. There was a statistically significant difference in HIV disclosure between genders; men (30.5%) were more likely to disclose their HIV status to partner or spouse than women (23.7%). Although not significant, the proportion of those who had experienced of stigma in the family or community/working place at least once was higher in men (5.3% and 7.6%, respectively) than in women (2.0% and 4.6%, respectively). Self-stigma was stated by almost all subjects; 96.9% in men and 94.7% in women.

The great majority of respondents (90.8%) had fears to be stigmatized because people would be afraid of getting HIV from contact with them. In addition, they were afraid of the appearance

FACTORS ASSOCIATED WITH ACCESS TO ART IN LAOS

Table 2 Health seeking behaviors for HIV testing and antiretroviral therapy according to gender

	Men		Women		Total	
	n	(%)	n	(%)	n	(%)
Age at HIV diagnosis (n=255) *	Median: 30 (Min: 0, Max: 63)					
<25 years	14	(11.6)	39	(29.1)	53	(20.8)
25–34 years	59	(48.8)	56	(41.8)	115	(45.1)
35–44 years	31	(25.6)	25	(18.7)	56	(22.0)
≥45 years	17	(14.0)	14	(10.4)	31	(12.1)
Main reason for HIV testing **						
Realized own risk behavior (voluntary)	12	(9.2)	4	(2.6)	16	(5.7)
Severe sickness	90	(68.7)	73	(48.0)	163	(57.6)
After partner or child infected/died	19	(14.5)	40	(26.3)	59	(20.8)
Diagnosed STD infection	4	(3.1)	13	(8.6)	17	(6.0)
Premarital/antenatal test after pregnancy	1	(0.8)	20	(13.2)	21	(7.4)
Social reasons	5	(3.8)	2	(1.3)	7	(2.5)
Duration between risk behavior and HIV-test						
<1 year	18	(13.7)	11	(7.2)	29	(10.2)
≥1 year	53	(40.5)	31	(20.4)	84	(11.0)
Don't know	60	(45.8)	110	(72.4)	170	(60.1)
Duration between diagnosis and seeking ART *						
≤1 month	106	(80.9)	136	(89.5)	242	(85.5)
>1 month	25	(19.1)	16	(10.5)	41	(14.5)
Main reason for delayed access (>1 month) to ART (n=41)						
Healthy/no sickness (asymptomatic)	10	(38.5)	2	(13.3)	12	(29.3)
Self depression (stress, shame and guilt)	6	(23.0)	7	(46.7)	13	(31.7)
No knowledge of service facility	10	(38.5)	6	(40.0)	16	(39.0)
CD4 at initiation of ART (cells/mm ³) *	Mean, SD: 149.6, ±166.5 (Range: 2–601)					
<200	64	(48.9)	54	(35.5)	118	(41.7)
200–350	16	(12.2)	35	(23.0)	51	(28.0)
>350	19	(14.5)	22	(14.5)	41	(14.5)
No CD4 testing	32	(24.4)	41	(27.0)	73	(25.8)
Duration of ART (months)						
1–30	75	(57.3)	80	(52.6)	155	(54.8)
31–60	26	(19.8)	29	(19.1)	55	(19.4)
>60	19	(14.5)	18	(11.8)	37	(13.1)
Don't remember	11	(8.4)	25	(16.4)	36	(12.7)

* $p < 0.05$, ** $p < 0.001$ by a Pearson's chi-square test

STD: sexually transmitted disease

Table 3 HIV disclosure and stigma experienced according to gender

	Men (n=131)		Women (n= 152)		Total (n=283)	
	n	(%)	n	(%)	n	(%)
Know HIV status of partner/spouse **						
Yes	59	(45.0)	99	(65.1)	158	(55.8)
No	72	(55.0)	53	(34.9)	125	(44.2)
Disclosed HIV status to *						
Spouse/partner only	40	(30.5)	36	(23.7)	76	(26.9)
Parents or relatives (except partner)	31	(23.7)	44	(28.9)	75	(26.5)
Spouse and relatives/closed friend	44	(33.6)	61	(40.2)	105	(37.1)
Nobody	16	(12.2)	11	(7.2)	27	(9.5)
Stigma experienced in family						
Yes	7	(5.3)	3	(2.0)	10	(3.5)
No	124	(94.7)	149	(98.0)	273	(96.5)
Stigma experienced in community						
Never	118	(90.1)	142	(93.4)	260	(91.9)
At least once	10	(7.6)	7	(4.6)	17	(6.0)
Often	3	(2.3)	3	(2.0)	6	(2.1)
Self-stigma						
Yes	127	(96.9)	144	(94.7)	271	(95.8)
No	4	(3.1)	8	(5.3)	12	(4.2)
Fears to be stigmatized because:						
People are afraid of getting HIV	123	(93.9)	134	(88.2)	257	(90.8)
People may not understand HIV transmission very well	70	(53.4)	76	(50.0)	146	(51.6)
People think that having HIV is shameful and should not associate with sufferers	60	(45.4)	65	(42.8)	125	(44.2)
Being gossiped about and blamed for life style and behavior	41	(31.3)	35	(23.0)	76	(26.9)
HIV symptoms appearance *	117	(89.3)	110	(82.4)	227	(80.2)

* $p < 0.05$, ** $p < 0.001$ by a Pearson's chi-square test

of HIV symptoms. Although those with fear of HIV symptoms appearance were significantly frequent among men (89.3%) compared with among women (82.4%), there was no significant difference in the other reasons between both genders.

Factors associated with delayed access to ART

Table 4 shows the factors associated with delayed access to ART. Among 283 respondents, 219 (77.4%) had delayed access to ART. In the unadjusted analysis, there were statistically significant

FACTORS ASSOCIATED WITH ACCESS TO ART IN LAOS

Table 4 Odds ratio (OR) and 95% confidence interval (CI) of the delayed access to antiretroviral therapy (ART)

	Delayed ^a /N (%)	cOR (95% CI) ^b	<i>p</i>	aOR (95% CI) ^c	<i>p</i>
Sex					
Men	104/131 (79.4)	1 (Reference)		1 (Reference)	
Women	115/152 (75.7)	0.81 (0.46–1.42)	0.455	0.87 (0.46–1.65)	0.673
Age at diagnosis					
<25 years	36/53 (67.9)	1 (Reference)		1 (Reference)	
25–34 years	100/122 (82.0)	1.89 (0.91–3.94)	0.090	2.17 (1.00–4.68)	0.049
35–44 years	42/56 (75.0)	1.73 (0.73–4.09)	0.211	2.02 (0.82–4.99)	0.128
≥45 years	18/23 (78.3)	1.62 (0.58–4.49)	0.355	1.71 (0.59–4.92)	0.321
Education level					
None or primary	68/82 (82.9)	1 (Reference)		1 (Reference)	
Secondary school	65/81 (80.2)	0.84 (0.38–1.85)	0.659	0.93 (0.39–2.23)	0.873
High school	60/72 (83.3)	1.03 (0.44–2.40)	0.946	0.97 (0.40–2.37)	0.946
College or higher	26/48 (54.2)	0.24 (0.11–0.55)	0.001	0.23 (0.10–0.55)	0.001
Marital status					
Single	40/53 (75.5)	1 (Reference)		1 (Reference)	
Married	116/154 (75.3)	0.99 (0.48–2.05)	0.983	0.61 (0.26–1.45)	0.263
Divorced	35/39 (89.7)	2.84 (0.85–9.53)	0.090	1.41 (0.36–5.48)	0.624
Widowed	28/37 (75.7)	1.01 (0.38–2.69)	0.982	0.64 (0.19–2.16)	0.476
Duration between risk behavior and HIV test					
<1 year	20/29 (69.0)	1 (Reference)		1 (Reference)	
≥1 year	75/84 (89.3)	3.75 (1.32–10.69)	0.013	3.83 (1.22–12.00)	0.021
Duration between diagnosis and seeking ART					
≤1 month	190/242 (78.5)	1 (Reference)		1 (Reference)	
>1 month	29/41 (70.7)	0.66 (0.32–1.39)	0.273	0.64 (0.28–1.45)	0.283
HIV infection disclosure					
No	55/82 (67.1)	1 (Reference)		1 (Reference)	
Yes	164/201 (81.6)	2.18 (1.22–3.90)	0.009	1.74 (0.90–3.41)	0.101
Self-stigma					
No	8/12 (66.7)	1 (Reference)		1 (Reference)	
Yes	211/271 (77.9)	1.76 (0.51–6.04)	0.370	0.85 (0.22–3.29)	0.810

a. Delayed access to ART was defined by a CD4 cell count < 350 cells/mm³ at the first screening or the advanced stage of AIDS-related symptoms classified by WHO clinical staging 3 or 4 in case that CD4 testing unavailable.

b. Crude odds ratio and 95% of confidence interval.

c. Adjusted odds ratio for age at diagnosis and education level and 95% of confidence interval.

N. Number of subjects for the category.

associations between delayed access and education background, duration between risk behavior and HIV test, and HIV disclosure. Those with high education in college school or higher were more likely to have access to ART earlier than those with low education in primary school or no education (OR=0.24; 95% CI: 0.11–0.55; $p=0.001$). Those who delayed HIV testing more than 1 year after engaging in risky behaviors were more likely to delay seeking access to ART, compared to those with a shorter period before HIV testing (OR=3.75; 95% CI: 1.32–10.69; $p=0.013$). Those who disclosed their HIV status were more likely to delay, compared to those concealed their HIV infection (OR=2.18; 95% CI: 1.22–3.90; $p=0.009$). The ORs adjusted for age at diagnosis and education level were statistically significant for age group 25 to 34 years (2.17; 95% CI: 1.00–4.68; $p=0.049$ relative to age group less than 25 years), education at college or higher (OR=0.23; 95% CI: 0.10–0.55; $p=0.001$ relative to the level of no education or primary education), and duration between risk behavior and HIV test more than 1 year (OR=3.83; 95% CI: 1.22–12.00; $p=0.021$ relative to less than 1 year).

DISCUSSION

This study examined factors associated with delayed access to ART among PLHIV in Vientiane, the capital of Lao PDR. Young age and low education were associated with delayed access to ART. It was evident that the duration of seeking ART after diagnosis had no association with delayed access to ART, but a significant association was found between the duration of seeking for a HIV test in this study. These findings indicated that the obstacle to early access to ART was late detection on HIV infection due to low perception, misconceptions of the HIV disease, lack of information on HIV treatment, and stigma issues.

Delayed access was also reported in several countries including Malawi and Tanzania.^{7, 15)} Young age and low education were associated with delayed access to ART in Uganda, Tanzania and the United States, and those with low education among PLHIV would have more problems in accessing medical care.^{9, 10, 16-19)} In this study, those aged 25 to 34 years at diagnosis, married people, and migrant labors were relatively frequent among the subjects. Rapid economical development in Laos is urging transit and migration, bringing about an expansion of sexual HIV infections. Mobile construction workers, business people, and traders have a higher level of vulnerability due to their likelihood to buy sex. Lao PDR has limited employment opportunities available within the country, especially in rural areas, so many Lao workers migrate to Thailand, where the prevalence of HIV is higher than Lao PDR. When they came back home, condom use was negligible within spousal relations in order to maintain the pretense of fidelity to their spouses, especially among young married people.⁴⁾ It was estimated that there are 7,390 HIV infections among migrant workers and their families in Laos,⁵⁾ and these people are in need of antiretroviral treatment, as well as care and support.

There was no significant association between gender and delayed access. However, the perception and realization of one's own risk behaviors for HIV infection showed a low level among women compared to men (2.6% and 9.2%, respectively). 26.3% of women were motivated for HIV testing after their partner or child was infected or died, compared to men (14.5%). On the other hand, women had a chance to access HIV testing during antenatal care; 20 women (13.2%) were identified with HIV infection through antenatal examinations. A national program for prevention of mother to child transmission of HIV has been providing free counseling and HIV testing for pregnant women at antenatal care clinics, enabling them to be identified and followed-up on prior to the onset of AIDS-related diseases. The advantage of this program includes the nationwide scaling up of antenatal HIV testing, increasing uptake among pregnant

women, as well as encouraging husbands to participate in HIV testing. A study in Thailand has shown that HIV transmission to spouse may have been avoided and may have not been widowed or divorced among them, if men have perceived in risk behavior, being diagnosed and treated earlier.²⁰ This study found a very small proportion of voluntary testing due to perception and realization of risk behaviors for both genders; 90 (68.7%) of men and 73 (48.0%) of women underwent HIV testing due to their severe health problems.

In terms of the main reason for the delayed ART access after diagnosis, among 41 respondents, feeling healthy with no AIDS-related symptoms was found to be higher in men (38.5%) than in women (13.3%), although not significant. Even though they already knew their HIV status, misconceptions about the disease prognosis, as well as no knowledge of ART information, might have lead them to delay access to ART. Self depression and no knowledge on ART service facilities were shown in a higher proportion of women (46.7% and 40.0%, respectively) than among men (23.0% and 38.5%, respectively).

Fears of stigma were possibly the main barriers, leading patients to stress and depression, and then hesitation in accessing health care services. Although self-stigma was not significantly associated with delayed access to ART due to only a few subjects being without self-stigma in this study, some studies have demonstrated that stigma was barriers in the uptake of HIV services.^{6, 11} The problem of stigma and discrimination among PLHIV has been a burden in every developing country, including Laos. Self-stigma could also be expressed as an internal fear that PLHIV might be discriminated against in society.^{11, 12, 21-26}

This was the first study in Laos to assess and explore the factors associated with delayed access to ART among PLHIV. There were several limitations to this study. Firstly, the study was conducted at only two sites in the country and the respondents cannot be assumed to be representative of the whole PLHIV in Laos. Secondly, other factors of socio-economy and geography of PLHIV, such as income and barriers of transportation between urban and rural areas, were not included. Thirdly, the questions on HIV-related stigma and discrimination were too simple to provide clear pictures surrounding PLHIV, especially self-stigma and individual depression, which should be explored to obtain more profound insight.

Based on the National Strategic and Action Plan on HIV/AIDS and STI Control and Prevention 2011–2015 in Laos, it was expected that over 90% of adults and children with advanced HIV infection would receive ART by 2015,⁵ while eight ART sites could manage 58.2% of patients in 2013.⁴

In designing interventions to improve ART access and coverage, the relatively delayed access to ART among young married people and low-educated people indicated the scope for efforts to provide services that meet the needs of these groups. Further research among high risk adolescents is needed to identify the contextual factors leading to higher-risk behaviors (such as multiple concurrent partners or drug use), so that effective interventions can be designed and implemented. Where evidence shows low perception of risk behaviors, those groups can be reached through mass media, and need to be included in the priorities. Among HIV-positive people, low perception of disease prognosis, poor access to medical care, awareness of HIV/AIDS-related stigma and its effects on access to treatment should be further assessed. Methods to overcome these difficulties might increase earlier ART access and pave the way to higher coverage.^{27, 28}

In conclusion, young age and low education were factors associated of delayed access to ART. Low perception of risk behaviors may lead them to ignore seeking HIV testing following late detection of HIV infection. Misconception of HIV disease prognosis, lack of ART information, poor access to medical care and stigma issues could be the reasons for delayed access to ART for HIV-positive people. In order to detect HIV infection following access to ART earlier, the

improvement of perceptual knowledge on HIV disease and treatment, as well as the reduction of HIV/AIDS-related stigma, might be needed to increase more efforts on health education for those target populations.

ACKNOWLEDGEMENTS

The authors would like to thank Dr. Bounpheng Philavong, Director of Center for HIV/AIDS and STI (CHAS) for his support to conduct this study under the national survey, and all CHAS staff involved in leading and coordinating the survey teams. We would like to express our special thanks to Dr. Saykham Phaxayyaseng, Head of HIV/AIDS care unit of Setthathirath Hospital; Dr. Prasith Phimmason, Head of HIV/AIDS care unit of Mahosot Hospital for their kind cooperation and all health staff who helped us in data collection, and our grateful thanks to all PLHIV respondents who took part in this study.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interests.

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FACTORS ASSOCIATED WITH ACCESS TO ART IN LAOS

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