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## Antiretroviral therapy adherence and self-efficacy among people living with HIV and a history of drug use in Vietnam

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### Abstract

People living with HIV with a history of drug use face additional psychosocial challenges that could compromise their adherence to antiretroviral therapy (ART). This study examined ART treatment adherence and adherence self-efficacy among people living with HIV with a history of drug use in Vietnam. We used cross-sectional baseline data collected between October 2014 and February 2015 from a randomized controlled trial in Vietnam. Of the 900 persons with a history of drug use in the trial, a sample of 109 people living with HIV currently on ART were included in the study. The vast majority (92%) of the participants reported not missing any medications in the past 30 days. Multiple regression results indicated that social support was positively associated with adherence self-efficacy ( $\beta = 0.420$ ,  $P < 0.001$ ) and general adherence to ART ( $\beta = 0.201$ ,  $P = 0.0368$ ). General adherence to ART was negatively associated with depressive symptoms ( $\beta = -0.188$ ,  $P = 0.046$ ) and current heroin use ( $\beta = -0.196$ ,  $P = 0.042$ ). These findings underscore the importance of addressing mental health and social challenges facing people living with HIV with a history of drug use to promote ART treatment adherence. Clinical management of HIV should identify and address concurrent substance use behaviors to maximize adherence and treatment outcomes.

### Keywords

HIV; ART adherence; drug use; Vietnam

### Introduction

People living with HIV with a history of drug use are susceptible to exacerbated psychosocial challenges, including HIV-drug use layered stigma and discrimination, economic and social burdens associated with underemployment, social isolation, family tension, and continued struggles with addiction.<sup>1–6</sup> An increased prevalence and frequency of mental illnesses, such as anxiety and depression, has been found among people living

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with HIV with a history of drug use.<sup>7,8</sup> Moreover, both HIV and drug use contribute to the development of cognitive and memory impairment, which complicates the care for people living with HIV.<sup>9,10</sup>

The various challenges facing people living with HIV with a history of drug use may have a significant negative impact on their treatment and care. Previous studies have demonstrated that compared with other risk groups, HIV-infected drug users are less likely to access needed medical care.<sup>11–13</sup> Adherence to antiretroviral therapy (ART) is dramatically lower in individuals who report a history of injection drug use, and the gaps in treatment adherence have resulted in compromised clinical outcomes.<sup>14–17</sup> A national evaluation study in Vietnam has reported that people living with HIV with a history of injection drug use have lower CD4 cell counts and present with a more severe WHO disease stage than non-drug users.<sup>18</sup> A cohort study has shown that HIV-positive drug users have higher age-matched morbidity and mortality rates compared with people living with HIV who do not use drugs.<sup>19</sup>

Several studies have examined factors that may be associated with ART adherence among people living with HIV who use drugs. Psychologically, mental health problem was common in people infected with HIV. Psychiatric disorders, especially depression, have been consistently reported to be correlated with poor ART adherence.<sup>20–22</sup> The association may have gender difference, and women with more depressive symptoms had been found to have poorer adherence than women with fewer symptoms in one study, but the association has not been observed in men.<sup>20</sup> Adherence was found to be related to family and social level barriers.<sup>21,23,24</sup> A family member living close to people living with HIV could play an important role in reminding them to take drugs. Women expressed desire for support in communicating with their husbands' family.<sup>23</sup> HIV-related stigma has an adverse effect on ART adherence because it compromises the adaptive coping and social support of people living with HIV.<sup>22</sup> Social support has been found to be associated with better treatment adherence in individuals infected with HIV and may be a key component of adherence interventions.<sup>24</sup> It could directly influence adherence in various ways, including moral support, treatment-related information support, communication skills with health provider support and providing basic needs such as food and shelter.<sup>23</sup> It could also be related to adherence by being associated with depression and anxiety.<sup>24</sup> In addition, active drug users, defined as people who currently use drugs, generally have lower ART adherence than former drug users.<sup>21,25</sup> Besides, a study conducted in sub-Saharan Africa has suggested that adherence rates are poor among those just starting ART and those who have been undergoing treatment for more than one year.<sup>26</sup>

The HIV epidemic in Vietnam is concentrated primarily among people who inject drugs (PWID), who account for 65% of the reported HIV infections.<sup>27–29</sup> HIV sentinel surveillance suggests that the prevalence of HIV among PWID was 11.6% in 2013.<sup>30</sup> Despite the continued remarkable increase in administration of ART in this country, low treatment adherence and subsequent treatment failure and mortality are major remaining challenges.<sup>31</sup> Currently, little is known about the various factors that influence ART adherence among people living with HIV with a history of drug use in Vietnam.<sup>32</sup> This study examined factors associated with ART adherence among people living with HIV with

a history of drug use in Vietnam, including demographic characteristics, depressive symptoms, social support, and current heroin use. Our findings can potentially inform intervention strategies to support people living with HIV with a history of drug use to address challenges associated with their ART adherence.

## Methods

### Study design and participants

This study used cross-sectional baseline data from a randomized controlled intervention trial. The assessments were conducted between October 2014 and February 2015 in the Vĩnh Phúc and Phú Thọ Provinces in northern Vietnam. Sixty (out of 412) communes in the two provinces were included in the study, 28 in Phú Thọ and 32 in Vĩnh Phúc. Commune selection in each province was based on the number of registered PWID in the commune. Only the communes with 20 or more registered PWID were included in the study to ensure enough caseload in each commune. Approval for this study was obtained from the appropriate institutional review boards.

In Vietnam, people with a history of drug use usually seek curative and preventive health services from commune health centers.<sup>33</sup> To recruit the participants, recruitment flyers were posted in the local commune health centers. The flyer described the project as a ‘Health Service Study’ and provided a phone number so that potential participants can either call for more information or meet with project staff at the clinic. The providers at commune health centers assisted with participant recruitment by introducing the project through a verbal explanation and a printed flyer to potential participants, who were then referred to a study recruiter for individual screening for eligibility. The inclusion criteria were (1) age 18 years or older, (2) having a history of heroin use, and (3) residing in one of the selected communes. A total of 968 eligible participants were approached, and 900 were successfully recruited with an agreement rate of 93%. Of the 900 participants, 109 were HIV-positive and currently on ART, and thus included in the analysis of this study.

### Data collection

The assessment was conducted individually in a private place, such as an office at a local commune health center. After participants give informed consent, the study team administered the assessment using the Audio Computer-Assisted Self-interview (ACASI) method. The participant listened to the survey questions read in the audio system (also shown on the screen) and directly entered their responses into a laptop computer. To reduce the difficulty that may lead to bias when participants had low level of education, we had trained project staff stand by to clarify the assessment questions and provide instructions for using ACASI when needed. The assessment took approximately 45min to complete. The participants received 80,000 ðng (\$4.00 US) for their participation.

### Measures

Socio-demographic characteristics were collected, including age, gender, education, marital status and annual family income. *Current heroin use* was determined by a urine test (detected as morphine in urine), administered as part of the study in the commune health

centers at the same time of the assessment. *The length on ART (in years)* was measured by asking participants how long they have been on ART. The participants were asked the number of time(s) they missed ART medicine in the last 30 days.

*Depressive symptoms* were measured by using a short version of the Zung Self-Rating Depression Scale.<sup>34</sup> This 10-item instrument was adapted from the original 20-item questionnaire and was successfully used in China.<sup>35</sup> The scale of six negatively-worded items, such as 'I get tired for no reason' and 'I have trouble sleeping at night', and positively-worded items, such as 'I feel hopeful about the future'. The participants were asked how often they felt each of the items. The response categories ranged from (1) 'a little of the time' to (4) 'most of the time'. After reversely coding the positive items, a continuous variable was generated by summing the items. A higher overall score indicated a higher level of depressive symptoms (Cronbach's  $\alpha = 0.83$ ). The range of the score (min–max) was 10–40.

*Social support* was assessed based on the Medical Outcomes Study Social Support Scale.<sup>36</sup> Good reliability and validity of the MOS Social Support Survey has been demonstrated in a Chinese population.<sup>37</sup> Two subscales, emotional support (containing eight items) and tangible support (containing four items), were adopted in the study. Each item was scored from (1) 'none of the time' to (5) 'all of the time'. The overall social support score was calculated by summing all items on each subscale. A higher score indicated a higher level of social support (Cronbach's  $\alpha = 0.95$ ). The range of the score (min–max) was 12–60.

*Adherence self-efficacy* was measured based on the HIV Treatment Adherence Self-Efficacy Scale (HIV-ASES). The HIV-ASES was validated among two samples of HIV-positive adults on ART and demonstrated robust reliability and validity, supporting its use in HIV treatment adherence research.<sup>38</sup> The participants were asked how confident they have been in the past month performing the following six activities: (1) adhering to the treatment plan even when side effects begin to interfere with daily activities; (2) integrating the treatment into their daily routine; (3) adhering to the treatment schedule when not feeling well; (4) continuing with the treatment even when getting to clinic appointments is a major hassle; (5) continuing with the treatment even when it is not convenient; and (6) experiencing something positive from their participation in treatment, even if the medication does not improve health. The participants could choose from (0) 'not at all confident' to (2) 'very confident' for each of the activities. A score is calculated by summing all the six items. A higher score indicated a higher level of ART adherence self-efficacy Cronbach's  $\alpha = 0.93$ . The range of the score (min–max) was 0–12.

*ART general adherence* was assessed using the Antiretroviral General Adherence Scale (AGAS). The psychometric properties of AGAS have been assessed in two samples of HIV-infected individuals, and the reliability and validity of the AGAS were supported in both samples.<sup>39</sup> Local experts have confirmed the cultural relevancy of the scale, and we have pilot-tested the scale in a previous study in Phú Thọ province. The scale includes four items: (1) 'I found it easy to take my ARV medications as my health care provider advised'; (2) 'I did what was needed to take my anti-retroviral medicines as my health care provider advised'; (3) 'I took my medicines exactly as my health care providers advised'; and (4)

‘generally speaking, how often during the past 30 days were you able to take your ARV medications as your health care providers advised?’. The items were scored using a five-point Likert scale from (1) ‘none of the time’ to (5) ‘all of the time’. A summary score is calculated by summing all the four items. A higher score indicated a higher level of general adherence to ART (Cronbach’s  $\alpha = 0.92$ ). The range of the summary score (min–max) was 4–20.

### Data analysis

Participants’ demographic characteristics, depressive symptoms, social support, current heroin use (assessed by positive urine test for morphine), duration on ART, self-reported ART adherence, adherence self-efficacy and general adherence to ART were first descriptively analyzed. Correlations across various characteristics associated with ART adherence were examined. Two multiple linear regression models were performed to examine the factors associated with adherence self-efficacy and general adherence to ART. Demographic characteristics (age, gender, year of education), current heroin use, depressive symptoms, social support, and years on ART were included in the model. Standardized regression coefficients and their significance levels were reported. All analyses were conducted using SAS for Windows (Version 9.4).

### Results

Table 1 presents the sample demographic characteristics, current heroin use status, depressive symptoms, social support, and ART-related items. Among the 109 people living with HIV with a history of drug use, less than half (45.0%) were between 36 and 44 years old, and the majority were males (89.9%). More than half (52.3%) of the participants had received 10 years or more of education. The majority (72.5%) were married or living with a partner at the time of the assessment. Approximately half (50.4%) of the sample reported a total annual family income between 20,000,001 to 50,000,000 ðng (\$896.66 to \$2241.65).

Table 1 also shows that approximately one-fifths ( $N = 23$ ; 21.1%) of the participants were currently using heroin (assessed by a positive urine test for morphine). Approximately two-thirds (64.2%) of the participants had been on ART for five years or less. The vast majority (91.7%) reported not missing an ART dosage in the past 30 days. The means and standard deviations of the adherence self-efficacy and general ART adherence scales are also presented in Table 1.

As shown in Table 2, adherence self-efficacy was negatively associated with depressive symptoms ( $r = -0.192$ ) and positively associated with social support ( $r = 0.450$ ). ART general adherence was negatively associated with current heroin use ( $r = -0.200$ ) and depressive symptoms ( $r = -0.221$ ). The correlation between ART general adherence and social support ( $r = 0.221$ ) was positive and statistically significant. General adherence to ART and adherence self-efficacy were significantly associated with one another ( $r = 0.290$ ).

Multiple regression results for adherence self-efficacy and the ART general adherence score are shown in Table 3. Controlling for the other covariates, higher adherence self-efficacy was found to be associated with social support (standardized  $\beta = 0.420$ ,  $P < 0.001$ ). ART general

adherence was associated with a lower level of depressive symptoms (standardized  $\beta = -0.188$ ,  $P= 0.046$ ) and a higher level of social support (standardized  $\beta = 0.201$ ,  $P= 0.037$ ). Current heroin use was associated with a lower level of ART general adherence (standardized  $\beta = -0.196$ ,  $P= 0.042$ ).

## Discussion

This study examined the ART adherence and its associated factors among people living with HIV with a history of drug use. The results revealed that higher levels of social support were associated with better ART adherence self-efficacy and general adherence to ART, suggesting the importance of social support in ART adherence among people living with HIV with a history of drug use. This finding is consistent with previous studies indicating that social support facilitates healthcare utilization and treatment engagement via direct and indirect paths.<sup>40–42</sup> Specifically, tangible social support (refers to assistance with medication pick-up, the provision of material goods, reminders, and/or financial aids when in need) is a prerequisite for people living with HIV to resume their routine and maintain compliance when difficulties arise.<sup>43</sup> Emotional social support (refers to conveying empathy, acceptance, concern, affection, love, encouragement, or caring) helps to cope with an HIV diagnosis, overcome fears and stigma, and proceed with treatment.<sup>36,44,45</sup> Future interventions focusing on identifying and soliciting social support for people living with HIV with a history of heroin use could potentially promote treatment adherence and improve clinical outcomes.

In this study, the participants with a higher level of depressive symptoms were more likely to have a lower ART adherence score. Published studies have also suggested that depression is one of the strongest predictors of poor treatment adherence and subsequently compromised treatment outcomes.<sup>46</sup> The issue of mental health is particularly relevant for a drug-using population; heroin use can result in numerous negative psychiatric mortalities including depression, either as part of the withdrawal process or as a consequence of repeated use, and psychiatric symptoms can in turn increase the risk of heroin use.<sup>2</sup> To ensure successful therapy, it is particularly essential to adopt a comprehensive and integrated approach to screen, diagnose, and treat patients with the triple conditions of HIV, substance abuse, and psychiatric comorbidities.<sup>19,47</sup>

We observed a negative correlation between active heroin use and adherence to ART in this study. Illicit substance use has been well documented in the literature as an obstacle to treatment and care and a risk for sub-optimal treatment outcomes in HIV-infected individuals.<sup>16,48</sup> A longitudinal study examining the impact of substance use on medication adherence among a cohort of HIV-infected adults revealed that current drug use behavior was associated with a greater than four-fold risk of adherence failure.<sup>49</sup> In addition to unintentional nonadherence, active substance users may intentionally avoid taking medications when using illicit drugs due to beliefs regarding interactive toxicity.<sup>50</sup> This finding suggests that the clinical management of HIV must identify and address active substance use. Harm reduction interventions aimed at reducing continuing drug use should be integrated with HIV treatment programs to maximize adherence to antiviral regimens.



Findings should be interpreted within the context of the study limitations. First, participants in this study were recruited from commune health centers where local residents regularly receive health services. Therefore, our findings may not be generalizable to people living with HIV with a history of drug use who did not receive services from commune health centers. Second, we did not include people living with HIV with a history of drug use with severe neurocognitive impairment. As an eligibility criterion, we included only those who were competent to provide written informed consent. Therefore, our findings may not be generalizable to potential participants with severe neurocognitive impairment. Finally, accurate measurement of ART treatment adherence has always been a challenge because self-reports are highly subject to recall bias or social desirability bias.<sup>51</sup> In the present study, self-reported ART adherence was high, with 92% of the participants reporting not missing any dose in the past 30 days. This number should be interpreted with caution because it might represent an overestimation of actual ART adherence. In the absence of some objective measures such as pill counts, biological assays, and electronic drug monitoring strategies, we adopted a combination of two behavioral instruments as an index of treatment adherence because of the low cost and ease of administration.

Despite these limitations, our findings underscore the importance of addressing the various challenges faced by people living with HIV with a history of drug use to improve their ART adherence. Future programs should be designed to utilize available social support to assist people living with HIV with a history of drug use (or active heroin use) in preparation for ART. The identification and treatment of psychosocial conditions and concurrent drug using behaviors should be integrated into HIV/AIDS treatment regimens to optimize the entire continuum of care. In Vietnam, commune health workers, the healthcare professionals working in the primary healthcare system, can play a critical role in providing a continuum of care for people living with HIV and people who use drugs. To address the challenges people living with HIV face with drug use and psychosocial conditions, we are currently conducting an intervention trial to enhance the capacity of commune health workers in supporting HIV-infected patients with drug use challenges, to address their psychosocial challenges, improve their ART adherence, and optimize their treatment outcomes.

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**Table 1**Sample description ( $N=109$ ).

	Count (%)
Age (years)	
35 or younger	32 (29.3)
36–44	49 (45.0)
45 or older	28 (25.7)
Gender	
Male	98 (89.9)
Female	11 (10.1)
Education	
1–6 years	16 (14.7)
7–9 years	36 (33.0)
10 years or more	57 (52.3)
Marital status	
Single	23 (21.1)
Married/living with your partner	79 (72.5)
Divorced, separated or widowed	7 (6.4)
Annual family income ( ðng)	
20,000,000 or less	21 (19.3)
20,000,001–50,000,000	55 (50.4)
50,000,001–120,000,000	33 (30.3)
Currently use heroin	23 (21.1)
Length on ART	
Five years or less	70 (64.2)
More than five years	39 (35.8)
Missed ART at least once in the last 30 days	9 (8.3)
	Mean (SD)
Depressive symptoms	19.0 (5.4)
Social support	41.9 (8.3)
Adherence self-efficacy	11.0 (1.9)
General adherence to ART	17.6 (2.3)

ART: antiretroviral therapy.

**Table 2**Correlation coefficients among selected variables ( $N= 109$ ).

Variable	1	2	3	4	5	6	7	8	9
1. Age									
2. Female	-0.053								
3. Years of education	-0.194 *	-0.043							
4. Currently use heroin	0.111	-0.173	-0.081						
5. Depressive symptoms	0.091	-0.034	-0.021	0.055					
6. Social support	-0.102	0.079	0.004	0.006	-0.111				
7. Length of time on ART (years)	0.121	-0.064	0.023	-0.065	0.008	0.153			
8. Not missing ART in the last 30 days	0.044	-0.01	0.078	-0.172	0.025	-0.009	-0.046		
9. Adherence self-efficacy	-0.063	0.074	0.06	-0.141	-0.192 *	0.450 ***	0.13	-0.012	
10. General adherence to ART	-0.068	0.003	0.012	-0.200 *	-0.221 *	0.221 *	0.091	0.008	0.290 **

ART: antiretroviral therapy.

\*  $P < 0.05$ .\*\*  $P < 0.01$ .\*\*\*  $P < 0.001$ .

**Table 3**Multiple regression for treatment self-efficacy and general adherence to ART ( $N= 109$ ).

Characteristics	Adherence self-efficacy		General adherence to ART	
	Standardized $\beta$ -Coefficient	<i>P</i> -value	Standardized $\beta$ -Coefficient	<i>P</i> -value
Age	0.031	0.738	-0.023	0.815
Female	0.028	0.756	-0.052	0.583
Years of education	0.051	0.569	-0.016	0.867
Currently use heroin	-0.118	0.188	-0.196	0.042
Depressive symptoms	-0.147	0.097	-0.188	0.046
Social support	0.420	<.001	0.201	0.037
Length of ART	0.055	0.539	-0.049	0.610

ART: antiretroviral therapy.