The relationship between health-related variables and increases in smoking among recently diagnosed HIV+ people who inject drugs in Vietnam

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HIGHLIGHTS

- 93.5% of HIV+PWID in Thai Nguyen province, Vietnam reported smoking at baseline.
- Higher CD4 counts and higher quality of life predicted increases in smoking.
- Qualitative participants voiced improved perceived health led to smoking increases.

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ABSTRACT

Background: In Vietnam tobacco smoking is prevalent among people living with HIV (PLHIV) and causes excess mortality in this population. Injection drug use is a driver of HIV infections in Vietnam. Changes in HIV disease state may correlate to changes in smoking among PLHIV. This study investigates the relationship between increases in smoking and health-related variables among recently diagnosed HIV+ people who inject drugs (PWID) in Vietnam.

Methods: We analyzed longitudinal data from 323 recently diagnosed HIV+ PWID in a randomized controlled trial from 2009 to 2013 in Thai Nguyen province, Vietnam. The outcome was an increase of > one cigarette/day from baseline visit cigarette smoking. A generalized estimating equation for repeated measures was used to estimate bivariable and multivariable associations between participant characteristics and smoking increases. We collected qualitative data to enhance our understanding of quantitative results, from 16 HIV+ PWID who smoke.

Results: Ninety three point 5% of participants reported some smoking at baseline. Smoking fewer cigarettes, higher health related quality of life (QOL), and higher CD4 counts were predictive of increases in smoking at future visits in a multivariable model. Qualitative data showed smoking increases were tied to improved perceived health, and counseling during respiratory illnesses may increase intention to quit.

Conclusion: HIV+ PWID in Vietnam smoke at a very high rate. Increases in their smoking are correlated to increases in heath-related QOL, and increases in perceptions of health. Any tobacco-use intervention should account for internal tobacco use triggers faced by HIV+ PWID.

1. Introduction

Tobacco use is prevalent in people living with HIV (PLHIV), and is responsible for disproportionate mortality in this population (Helleberg et al., 2013; Mdege, Shah, Ayo-Yusuf, Hakim, & Siddiqi, 2017; Shuter & Bernstein, 2008; Tesoriero, Gieryic, Carrascal, & Lavigne, 2010). In the post-HAART era it has been estimated that 12.3 life-years are lost by PLHIV to smoking tobacco, compared to 5.1 life-years lost by PLHIV to HIV itself (Helleberg et al., 2013). Excess smoking-related mortality in PLHIV can be attributed to respiratory disease, tuberculosis,

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cardiovascular disease, oral disease, reduced ART efficacy and malignancy (Cohen et al., 2002; Crothers et al., 2005; Feldman et al., 2006; Helleberg et al., 2013; Lewden et al., 2005). Among PLHIV worldwide, Tuberculosis (TB) is the leading cause of death, and preliminary research shows that PLHIV who smoke may be twice as likely to develop active TB, compared to PLHIV who do not smoke. (Ramin, Kam, Feleke, Jacob, & Jha, 2008; Miguez-Burbano et al., 2003; van Zyl Smit et al., 2010, WHO (World Health Organization), 2010; WHO (World Health Organization), 2016).

In Vietnam, injection drug use is a key driver of HIV infections (VAAC (Vietnam Administration of HIV/AIDs Control), 2017). In Vietnam, two studies have shown that tobacco use rates are higher among PLHIV (35.5%–36.1%) than rates among the general population (22.5%), and rates may be even higher among HIV infected individuals who inject drugs or are on Methadone Maintenance Treatment (MMT) (Nguyen et al., 2015; Nguyen et al., 2016; Richter, Ahluwalia, Mosier, Nazir, & Ahluwalia, 2002; WHO (World Health Organization), 2016; Tran et al., 2015; Do et al., 2017). Among people who inject drugs (PWID), smoking tobacco has been associated with increased disability, decreased quality of life, and continued illicit drug use; furthermore, among HIV-infected PWID tobacco use has been associated with virologic non-suppression (McCarthy, Zhou, Hser, & Collins, 2002; Hser, McCarthy, & Anglin, 1994; Winhusen et al., 2018). The high rates of tobacco use and injection drug use among PLHIV in Vietnam lead to disproportionate health risks in this population.

Previous research has theorized that the event of HIV diagnosis may be related to decreases in cigarette smoking and increases in intentions to quit (Vidrine et al., 2017; Collins et al., 2001). Outside of HIV, the literature contains various examples of poor health and hospitalizations positively influencing tobacco cessation attempts (Dawood et al., 2008; Gritz et al., 2006; Shi & Warner, 2010; Twardella et al., 2006). Following HIV diagnosis, health status can improve with treatment, or deteriorate with treatment failure or opportunistic infections. It has not been previously studied how smoking patterns change longitudinally following HIV diagnosis. It is possible that similar to how periods of poor health have been shown to facilitate cessation attempts, periods of good health may impede them. Determining how progression or improvements in HIV disease impact smoking patterns, specifically increases in smoking, among HIV-infected individuals can inform future tobacco use interventions for this population. If increases in smoking are linked to improvements in HIV disease progression, that lends more strength to the argument for integrated HIV and tobacco use treatment. Accordingly, this study aims to investigate the relationship between increases in smoking and health-related variables through a retrospective analysis of longitudinal data over 24 months among recently diagnosed HIV+ people who inject drugs in Vietnam.

2. Methods

2.1. Study population

We analyzed longitudinal data from recently diagnosed HIV-infected PWID who participated in a four-arm randomized controlled trial from 2009 to 2013 in Thai Nguyen province, Vietnam. The trial evaluated the effect of community-level and individual-level interventions on injection and sexual risk behaviors. The trial did not include a nicotine dependence intervention, and in-depth tobacco use interventions are not offered routinely in Vietnamese community health centers (WHO (World Health Organization), 2016; Shelley et al., 2017). Details of the trial and the primary outcomes have been reported elsewhere (Go et al., 2015).

Thai Nguyen is a northeastern province of Vietnam that has had rapidly increasing drug use since the mid-1990s, due to urbanization, easily accessible opium and an economy that attracts migrant workers. The trial enrolled 455 participants of 2136 approached, from the 32 sub-districts with the highest number of PWID. Participants were recruited through a snowball sampling technique by recruiters who were former and current drug users. Inclusion criteria were: 1) a study test confirmed HIV diagnosis, 2) the ability to bring in an injecting network partner for screening, 3) male, 4) at least 18 years old, 5) had sex in the past 6 months, 6) injected drugs in the past 6 months, and 7) planned to live in Thai Nguyen for the next 2 years. The trial was approved by the ethical review committees at the Thai Nguyen Center for Preventive Medicine and the Johns Hopkins Bloomberg School of Public Health. Written informed consent was obtained from all participants. For this analysis, participants who had prior knowledge of their HIV diagnosis and participants who were previously on HAART were excluded, leading to a study population of 323 individuals.

2.2. Conceptual model and hypothesis

This study examines longitudinal tobacco smoking data and assesses health status-related factors correlated to increases in smoking since the baseline visit. Our selection of health status factors was based on the teachable moment hypothesis. Specifically, McBride et al. describe how individuals feel an emotional response to increased personal risk, and as a result are more likely to adopt risk-reduction behaviors (McBride, Emmons, & Lipkus, 2003). In an inverse of this model, it was expected that improvements in HIV disease state post-diagnosis, in the absence of any specific tobacco intervention, may correlate with increases in tobacco smoking longitudinally.

2.3. Measures

In the baseline visit, participants were tested for HIV antibody. At baseline and at months 6, 12, 18 and 24 participants were administered a one-hour face-to-face interview using a structured questionnaire covering topics including demographics, drug use behaviors, clinical factors, quality of life, and cigarette smoking.

2.3.1. Demographics

Data were collected on age, marital status, employment status, and amount of education completed.

2.4. Cigarette smoking

Cigarette smoking was measured by asking participants how many days a week they smoked on average over the last three months, and how many cigarettes they smoked a day on average on the days that they smoked over the last three months. In order to investigate increases in smoking, a categorical outcome variable for an increase in smoking was created. An increase in smoking was defined as an increase of > one cigarette/day over the level of cigarette smoking reported at the baseline visit. A maintained level of smoking was defined as a change from baseline of less than one cigarette per day, and a decreased level of smoking was defined as a decrease of > 1 cigarette/day from baseline. The estimated number of cigarettes smoked per day was calculated by multiplying the number of cigarettes smoked per day of smoking by the number of days smoked per week, and dividing by seven.

2.5. Clinical factors

Clinical factors included ART treatment status, self-reported HIV symptom-score, and CD4 count. Blood was collected to measure CD4 count at each visit. The CD4 count was divided into a categorical variable with four levels (< 200; 200–349?; 350–500; > 500), based on the CDC HIV infection staging and the WHO's ART treatment guidelines (CDC (Center for Disease Control), 1992; WHO (World Health Organization), 2010). To incorporate a potential non-linear relationship, the CD4 variable was a continuous variable in the multivariable model. The HIV symptom score was measured by asking participants

how often on a 5 point scale they experience cough, chest pain, coughing up blood, recurrent fever, or abscess at injection site over the past three months. At each time point, the frequency of all five symptoms was averaged to create a frequency-weighted score of symptom intensity, based on the 1993 CDC criteria for classification of HIV infection severity into different HIV-related clinical conditions (CDC (Center for Disease Control), 1992). This score has been validated in US populations of people who inject drugs previously (Fleishman & Fogel, 1994; Mansergh, Marks, & Simoni, 1995).

2.6. Quality of life

Functional impairment was measured using the CDC health-related quality of life 14-item measure (CDC (Center for Disease Control), 2017). Participants were asked how much they agreed with 14 statements, including a general statement about self-reported health, using a 5 levels Likert scale. Due to low cell counts for greater health, in our analysis the measure of self-reported health was analyzed as a categorical variable with two levels of poor and fair or greater.

2.7. Statistical analysis

Descriptive statistics were used to describe characteristics of HIV-infected participants at baseline and smoking trends over time. A generalized estimating equation for repeated measures was used to estimate bivariable and multivariable associations between participant characteristics and increases in smoking, with binomial distribution and logit link function. Initially all variables from bivariable models were included in the multivariable model. Variables were dropped from the model if dropping them improved goodness of fit, evaluated with Quasi Akaike's information criterion (QIC) (Pan, 2001). The multivariable analysis used quadratic CD4 terms to allow for non-linear model fit. Odds ratios and 95% confidence intervals were calculated for each association. All analyses were conducted using SAS software version 9.4 (SAS [computer program], 2014).

2.8. Qualitative study in-depth interviews

We collected qualitative data to enhance our understanding of the relationship between health and smoking patterns in HIV+ PWID in Vietnam. Information on current knowledge and attitudes about smoking and smoking cessation and prior quit attempts were collected from semi-structured qualitative interviews with sixteen HIV+ PWID. Participants, through convenience sampling, were recruited from four HIV clinics in Hanoi, Vietnam in January to March of 2018. Participants were screened for eligibility at their HIV clinics by two trained native speaking ethnographers with extensive experience interviewing HIV infected PWID. Clients were eligible if they (1) identified as male, as almost all PWID and all smokers in Vietnam are men (WHO (World Health Organization), 2016; UNODC, 2017); (2) were 18 or above; (3) reported being a daily smoker; (4) reported current or any previous injection drug use during their lifetime; (5) had a confirmed HIV diagnosis; (6) lived in Hanoi and received care at a study clinic for > 3 months; and (7) could provide written informed consent. Interviews were conducted by native speaking ethnographers in private spaces near patient clinics, and lasted one hour. Interviews were recorded, transcribed, and translated into English for thematic analysis in Dedoose (SocioCultural Research Consultants, LLC, 2018). Interviews were read and examined for key themes and topics, which led to preliminary codes. During coding, the coding scheme was refined to include emergent themes. After coding for main themes, matrices were formed to compare results. Exemplary quotes were selected to illustrate key insights.

Table 1
Demographic characteristics of index participants at baseline (month 0).

Characteristic	Baseline (N = 323)
Age, median, years (IQR)	35.1 (31.1–39.4)
Marital status	
Single, n (%)	118 (36.5)
Currently married or living with partner, n (%)	157 (48.6)
Divorced, separated, or widowed, n (%)	48 (14.9)
Employment	
Full-time, n (%)	225 (69.7)
Part-time, n (%)	64 (19.8)
Unemployed, n (%)	33 (10.2)
Unable to work due to school, disability, or retirement, n (%)	1 (0.3)
Education completed	
No School, n (%)	1 (0.3)
Primary School, n (%)	28 (8.7)
Secondary School, n (%)	188 (58.2)
High School, n (%)	90 (27.9)
University, n (%)	16 (5.0)
CD4 category	
< 200, n (%)	131 (40.6)
200–350, n (%)	98 (30.3)
350–500, n (%)	51 (15.8)
> 500, n (%)	39 (12.1)
Self-reported health	
Fair health or greater, n (%)	233 (72.1)
Poor, n (%)	90 (27.9)

3. Results

3.1. Quantitative results

3.1.1. Demographics

Among the 323 trial participants, the median age was 35.1 years old (IQR 31.1–39.4) (Table 1). Most were employed full-time or part-time (89.5%). Most were either married (48.3%) or single (36.5%).

3.1.2. Clinical variables

Around three quarters (70.9%) had a CD4 count < 350, with almost all participants below 500 (87.9%). Most reported being either in fair (67.2%) or poor (27.9%) health.

3.1.3. Tobacco smoking variables

Most participants (93.5%) reported some cigarette smoking at baseline, smoking an average of twelve cigarettes per day and six days a week (Table 2). The proportion of participants reporting any smoking decreased from 93.5% at baseline to 83.1% at 24 months, however this decrease was non-significant (Table 3). However, at the each follow up, slightly less than half of participants (39.3%–44.6%) increased their smoking compared to baseline (Fig. 1). The proportion that increased their smoking was lowest at month 6 (39.3%) compared to subsequent months.

3.1.3.1. Bivariable analysis. In the bivariable repeated measures analysis seen in Table 4, an increase in smoking relative to baseline was more likely when individuals had a lower HIV-symptom score over the last 3 months, had reported smoking fewer cigarettes at the prior visit, and had scored higher on health related quality of life measures. ART treatment status and CD4 count were non-significant predictors. Other questions in the health related quality of life measure were non-

Table 2
Smoking characteristics of index participants at baseline (month 0).

Current Daily Smokers, N (%)	279 (86.4)
Current Less than daily smokers, N (%)	23 (7.1)
Cigarettes smoked per day, Mean, (standard deviation)	12.1 (7.4)
Days smoked per week, Mean, (standard deviation)	6.2 (2.0)

Table 3
Change in smoking from baseline to 24 months.

Characteristic	Baseline (N = 323)	6 Months (N = 262)	12 Months (N = 222)	18 Months (N = 195)	24 Months (N = 201)
Participants who smoke, N (%)	302 (93.5%)	223 (85.3%)	185 (83.3%)	162 (83.1%)	167 (83.1%)
Estimated cigarettes smoked per day (standard deviation)	12.2 (8.2)	10.8 (8.6)	10.0 (8.0)	10.0 (8.1)	10.0 (7.8)

significant as well but are not shown in Table 4.

3.1.3.2. Multivariable analysis. In multivariable analysis seen in Table 4, fewer cigarettes smoked at prior visits and improved health related quality of life significantly predicted an increase in smoking. Consistent with the tapering pattern seen in the bivariable analyses, CD4 count showed a non-linear relationship with increased smoking. Among patients not on ART, higher CD4 count was significantly associated with greater odds of increasing smoking at low levels of CD4, but this relationship leveled off at higher levels of CD4. Among those on ART, a different relationship was observed, with little change in odds of increasing smoking between CD4 counts of 100–400 cells/mm^3, but greater odds of increasing smoking as CD4 increased above 400 cells/mm^3.

3.2. Qualitative results

All participants interviewed had a background knowledge of the harms smoking had on health, but these harms didn't motivate them to quit smoking. Half of participants temporarily stopped their smoking due to poor health:

> "Recently, I got sick and my health was poor so I quit for 6 months. I couldn't smoke….When I smoked, I felt more tired, it was exhausting…I realized that the relaxing feeling of smoking is fake…" (Age 44, No Methadone, TB (treated), Past Drug use, Cigarette Smoker).

However, once participants regained their health they reported smoking again. These pauses in smoking were not deliberate attempts to quit smoking, but rather attempts to avoid the exacerbating effect smoking had on their symptoms.

> "One time, I got so severely sick, causing me to stay at the hospital for half a month. During that time (at the hospital), I didn't smoke anything but when I was conscious (again), I held cigarettes and smoked. I got dizziness due to cigarettes but I kept smoking." (Age 43, No Methadone, TB (treated), Current drug use, Cigarette and Waterpipe smoker).

Almost all participants were not planning to quit tobacco in the foreseeable future. However, participants who described significant counseling during symptomatic tuberculosis episodes were more worried about the effects tobacco had on their health. A few patients remarked that they were often counseled about tobacco by healthcare workers during periods of respiratory illness, but the counseling stopped after the illness subsided. One of the counseled participants was interested in quitting smoking:

> "I think that smoking a lot will cause me to have lung disease and cough again. I used to smoke a lot of cigarette cases but now I only smoke one per day. My lungs are weak now so I feel scared, my health is now very bad….I only think about giving up smoking but I don't know how to" (Age 42, On Methadone, TB (treated), Past drug use, Cigarette and Waterpipe smoker).

4. Discussion

Our study found that 93.5% of participants smoked at baseline, more than double the smoking prevalence among men in Vietnam (45.3%) (WHO (World Health Organization), 2016). This estimate is higher than a previous smoking rate estimate of 59.7% among HIV infected males in Vietnam (Nguyen et al., 2015; Nguyen et al., 2016). This may be in part because our population consisted of current PWID.

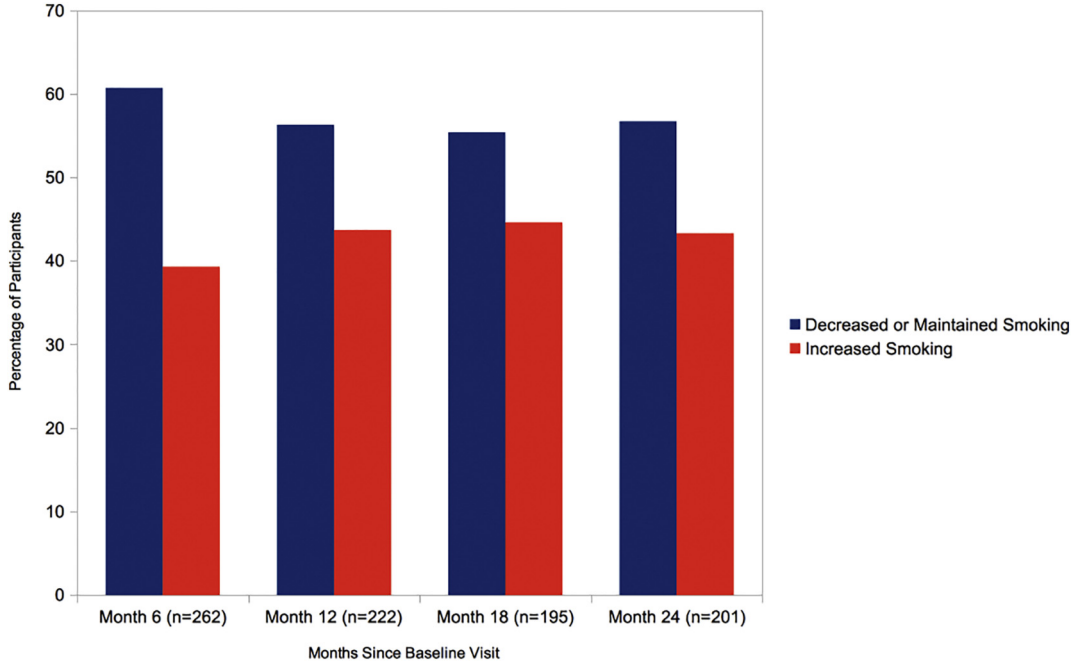

Fig. 1. Change in Smoking from Baseline to 24 months: Percentage of participants who decreased or maintained their smoking vs. increased the estimated number of cigarettes they smoked a day from baseline.

Table 4
Repeated measures bivariable and multivariable analysis modeling any increase in smoking since baseline visit.

Characteristic	Bivariable Estimate (95% CI)	P value	Multivariable Estimate (95% CI)	P value
Medical Symptoms Score (Greater score = More symptoms)	0.80 (0.68–0.93)	< 0.01	[a]	
Most recent CD4 count/100 (cells/μl)				
200 ≤CD4 < 350 (Ref CD4 < 200)	1.14 (0.78–1.65)	0.49	[a]	
350 ≤CD4 < 500 (Ref CD4 < 200)	1.23 (0.78–1.93)	0.38	[a]	
500 ≤CD4 (Ref CD4 < 200)	1.1 (0.63–1.93)	0.73	[a]	
Most recent CD4 count/100 (cells/μl)	[a]		1.43 (1.05–1.95)	0.02
Most recent CD4 count (cells/μl) squared	[a]		0.95 (0.92–0.99)	0.01
Most recent CD4 count/100 (cells/μl)[a] ART interaction	[a]		0.51 (0.24–1.06)	0.07
Most recent CD4 count (cells/μl) squared [a] ART interaction	[a]		1.12 (0.97–1.29)	0.13
Are you currently on antiretroviral medications for your HIV infection? (Ref = No)	1.2 (0.91–1.59)	0.20	2.21 (0.96–5.09)	0.06
Estimated number of cigarettes smoked per day?	0.96 (0.94–0.98)	< 0.0001	0.95 (0.93–0.98)	< 0.001
In general would you describe your health as fair or above?(Ref = Poor health)	1.52 (1.14–2.01)	< 0.01	1.67 (1.23–2.28)	0.001
Felt calm, energized, not depressed over the last four weeks? (Higher score = More calm)	1.13 (1.00–1.28)	0.04	*	

[a] Not included in model.

Previous studies have shown high rates of tobacco use among PWID in the US(Richter et al., 2002). In previously published qualitative research, PWID offered links between tobacco and injecting drugs, saying use of each made the other more enjoyable, and both were triggered by similar cues such as stress, withdrawal, or physical setting (McCool & Paschall Richter, 2003). There is limited neurobiological evidence of a synergistic effect of taking nicotine and narcotics together, including increased euphoria and decreased withdrawal, (Elkader, Brands, Selby, & Sproule, 2009). Another explanation for this trend is that tobacco smoking is a coping mechanism for drug cravings, a theory supported by previous research among opioid users (Frosch, Shoptaw, Nahom, & Jarvik, 2000; McCarthy et al., 2002). If that is the case, PWID who are experiencing drug cravings may rely on smoking as a coping mechanism. Given that among opioid users, smoking tobacco has been associated with increased disability, decreased quality of life, and continued illicit drug use, high levels of smoking among PWID is especially problematic (McCarthy et al., 2002). Given high smoking rates and the high risk of health complications in opioid users, integrating tobacco use treatment into substance abuse treatment in Vietnam should be further explored.

Among our sample of recently diagnosed HIV infected individuals, while overall numbers of smokers and levels of smoking decreased, at each follow-up visit almost half of participants increased their smoking from baseline levels. These data don't align with the theory that health promotion behaviors naturally increase following HIV-related health events such as HIV diagnosis, counseling or initiation of care (Collins et al., 2001; Vidrine et al., 2017). Cigarette smoking is widely socially accepted in Vietnam and tobacco use treatment is not readily accessible, which may explain why receiving an HIV diagnosis alone wasn't related to a decrease in smoking in our cohort. In seeking an explanation for what led certain participants to increase their smoking, we looked at predictors of increases in smoking in our cohort.

In unadjusted bivariable analysis, increases in health related quality of life measures, lower levels of smoking, and decreases in self-reported HIV symptom scores over the course of follow-up were predictive of subsequent increases in smoking. All these variables, except one health-related quality of life measure, remained significant in multivariable analysis. In multivariable analysis, CD4 counts had a non-linear relationship that varied with ART status. Those not on ART were more likely to increase smoking with increases in CD4 counts from low CD4 counts than those on ART. The correlation among those not on ART was significant, while among those on ART it was not.

Perceived health and clinical indicators such as CD4 count were more related to smoking behaviors than treatment status. A possible explanation for this relationship was found in our qualitative findings. Around half of our qualitative cohort of HIV infected individuals were likely to temporarily decrease their smoking during periods of illness. In our qualitative analysis decreases in smoking were not due to changing risk perceptions, or exposures to the healthcare system but because cigarette smoking was difficult to physically tolerate while ill. All of these participants reported resuming smoking when they felt well again. The increases in smoking seen in our data reflect participants resuming their 'normal' level of smoking as they have fewer HIV related symptoms. This theory is supported by lower levels of smoking being predictive of future increases in smoking. The non-linear relationship between CD4 counts and increases in smoking also supports this theory. Compared to increases from high CD4 counts, increases from lower CD4 counts may lead to more significant improvements in feelings of health and increases in smoking. The varying relationship with ART status also supports this theory, as those patients on ART often suffer feel unwell due to side effects when initially beginning their HAART treatment, despite improvements in CD4 counts (NIH (National Institutes of Health), 2019).

Our initial hypothesis, that increases in health would lead to a decrease in perceived personal risk and therefore increases in smoking, was incomplete. Our qualitative and quantitative findings show that in the absence of in-depth tobacco use counseling, HIV-infected PWID's CD4 counts, HIV symptoms, and perceived feelings of good health shape tobacco use patterns more than treatment status. Our qualitative data found that clients have increases in smoking when they feel their own health improve, a problematic finding in HIV-infected individuals without access to tobacco cessation materials, whose feelings of health increase as their HIV becomes effectively managed. This presents a challenge to providers as they manage both a patient's HIV and tobacco use, especially in Vietnam where tobacco use is common and socially accepted among HIV-infected people who inject drugs.

Promisingly, our qualitative findings do demonstrate how providers often provide tobacco counseling during tobacco-related illness, which can promote pro-cessation attitudes in some, but not all, patients. Providers should continue to link tobacco cessation counseling to periods of illness, as it has been previously found that tobacco cessation efforts may be more effective if delivered to patients during adverse health episodes (Deppen, Grogan, Aldrich, & Massion, 2014; Dawood et al., 2008; Lawson & Flocke, 2009; Shi and Warner, 2010; Gritz et al., 2006; Twardella et al., 2006). Given our findings, providers should also continue tobacco cessation counseling after patients recover from illnesses to prevent the return of pre-illness smoking levels (Rigotti et al., 2014).

This was the first study of the implications of health status on tobacco smoking patterns among HIV-infected PWID in Vietnam. Our conclusions should be considered in light of several factors. Participants were recruited through snowball sampling, and may not be representative of all HIV infected PWID in Vietnam. Also, these results may not be applicable to women, or other populations where injection

drug use is not a driver of the HIV epidemic. Due to the long follow-up time of this study, 35% of the sample size was lost to follow up, due to death, incarceration, or other reasons. However, in our analysis these participants had similar smoking patterns at baseline to the participants not lost to follow-up (data not shown).

In summary, HIV infected PWID in Vietnam smoke at a very high rate, and increases in their smoking are correlated to increases from low CD4 counts, increases in heath-related quality of life, and increases in perceived health status. PWID smokers may smoke at high rates as a way to cope with drug cravings, and HIV infected smokers that enter HIV treatment may increase their smoking in response to improvements in HIV-related symptoms. Since ratifying the WHO's Framework Convention on Tobacco Control, Vietnam has invested major resources in reducing tobacco use, but needs to do more in the area of providing evidence based treatment for tobacco use (WHO (World Health Organization), 2008; Shelley et al., 2017). Currently, evidence-based treatment for nicotine dependence is seen as outside the scope of HIV care clinics (Jaén et al., 2008). The HIV care clinic system in Vietnam provides an opportunity to target a tailored intervention to HIV infected tobacco users. This intervention should be sensitive to the internal tobacco use triggers faced by HIV infected people who inject drugs. Given the limited literature on tobacco smoking interventions for people infected with HIV and people who inject drugs (Calvo-Sanchez & Martinez, 2015; Pacek & Cioe, 2015; Pool, Dogar, Lindsay, Weatherburn, & Siddiqi, 2016), future efforts are needed to fully understand optimal tobacco use treatment for this population.

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