



Alcohol and tobacco use among methadone maintenance patients in Vietnamese rural mountainside areas



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ABSTRACT

Introduction: The expansion of methadone maintenance treatment (MMT) program requires more data about the factors affecting the effectiveness of treatment, especially behavioral data such as smoking and alcohol use among patients. This study aimed to examine the prevalence of tobacco and alcohol consumption and identify related factors among MMT patients in the Vietnamese rural mountainside.

Methods: We interviewed 241 MMT patients in two clinics in Tuyen Quang, a mountainous province in Vietnam. Patients were asked to report the smoking status (current smoker or not), nicotine dependence (by Fagerström test for nicotine dependence - FTND) and alcohol use (by using the Alcohol Use Disorders Identification Test – AUDIT-C). EuroQol-5 dimensions-5 levels (EQ-5D-5L) and EQ-Visual analogue scale (EQ-VAS) were employed to measure health-related quality of life. Multivariate logistic and Tobit regressions were used to identify the associated factors.

Results: The majority of respondents were current smokers (75.7%) and a low proportion were hazardous drinkers (18.3%). People receiving treatment in a rural clinic (OR = 0.45; 95%CI = 0.22–0.92) and had problems in usual activities (OR = 0.20; 95%CI = 0.06–0.70) were less likely to be smokers. Q-VAS score (Coef. = 0.03; 95%CI = 0.02–0.05) and having problems in mobility (Coef. = 0.72; 95%CI = 0.03–1.42) was found to be associated with the increase of nicotine dependence. In terms of alcohol drinking, people with other jobs were more likely to drink hazardously compared to unemployed patients (OR = 2.86; 95%CI = 1.20–6.82). Similarly, patients having higher duration of MMT had higher likelihood of being hazardous drinkers (OR = 1.07; 95%CI = 1.01–1.13).

Conclusions: This study highlights the low rate of alcohol abusers but a considerably high proportion of current smokers among MMT patients in the rural mountainside area. Alcohol and tobacco counseling programs combined with social and family support also play an essential role in alcohol and tobacco control. In addition, implementing mass community-based behavioral change campaigns to reduce drug addiction-related stigmatization should also be prioritized.

Abbreviations: MMT, methadone maintenance treatment; HIV, human immunodeficiency virus; ART, antiretroviral therapy; AIDS, acquired immune deficiency syndromes; HRQOL, health related-quality of life; EQ-5D-5L, EuroQol - five dimensions - five levels; VAS, visual analogue scale; AUDIT-C, Alcohol Use Disorders Identification Test-Consumption; FTND, Fagerström test for nicotine dependence

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1. Introduction

Tobacco smoking and alcohol use have been well-documented as among top risk factors for global burden of diseases (Fein, Fletcher, & Di Sclafani, 1998; John et al., 2007; Rao & Andrade, 2016; Tran et al., 2011; WHO, 2015a; WHO, 2015b; Wynder, 1954). However, these problems are common in drug use population (Teesson et al., 2012). Various studies have shown that tobacco and alcohol abuse often co-exist among patients enrolled in methadone maintenance treatment (MMT) programs (Richter et al., 2007a; Shadel et al., 2005; Teplin et al., 2007). The prevalence of cigarette use in this group is extremely high, ranging from 73% to 94% (Richter et al., 2001; Stark & Campbell, 1993a; Zirkazadeh et al., 2013), whereas the rate of alcohol abuse is various from 5% to 49% (Hillebrand et al., 2001; Hunt et al., 1986; Rengade, Kahn, & Schwan, 2009; Siassi & Alston, 1976). A study Elkader et al. endorsed that the interaction between methadone and nicotine may alleviate mental health problems and other smoking-related illnesses (Elkader et al., 2009). In addition, excessive alcohol use among MMT patients has been found to be associated with poor quality of life, psychological impairments and increased risk of mortality (Nyamathi et al., 2009a).

Screening and identifying patients who are at risk of alcohol and tobacco addiction are vital for promptly counseling and treatment. However, characteristics of addicted patients may vary across settings. Some studies found that people with higher duration of MMT were less likely to drink hazardously or smoking heavily (Baran-Furga et al., 2005; Do et al., 2017; Duan et al., 2017), while others indicates no association (Stark & Campbell, 1993b). Song Duan et al. (2017) in China found that male, older and less educated patients had higher likelihood to be heavy smokers and hazardous drinkers (Duan et al., 2017). Meanwhile, Huyen et al. in Vietnam suggested that being employed was a negative predictor of level of nicotine dependence (Do et al., 2017). Patients with HIV positive were found to have lower likelihood of smoking and alcohol abusing than those with HIV negative (Do et al., 2017; Duan et al., 2017). With these variabilities of potential markers for predicting alcohol and smoking addicts among MMT patients, understanding the factors associated with these risk behaviors is essential in order to ensure the effectiveness of MMT program.

Tobacco and alcohol are highly prevalent among general Vietnamese population. Data on Global Adult Tobacco Survey 2015 indicated that the overall smoking rate of Vietnamese people were 22.5%; 45.3% among males and 1.1% among females (Van Minh et al., 2017). Moreover, a national survey suggested that > 40% of men drank hazardously compared to only below 5% of female (Bui et al., 2015). To resolve these phenomenon, the National Assembly of Vietnam issued the Law on prevention and control of tobacco harms in 2012 to better control the smoking epidemic (The National Assembly of Vietnam, 2012). In addition, a draft of law on alcohol and beer harm prevention has been proposed to response to the increasing trend of alcohol users (The National Assembly of Vietnam, 2016). These regulations are a crucial steppingstone for later measures for tobacco and alcohol control, especially in the MMT group.

Currently, there has been 251 MMT clinics operated with > 46,000 patients in Vietnam (Control, V.A.o.H.A., 2016). Understanding smoking and alcohol use patterns among patients are vital to optimize the effectiveness of MMT program. However, to our knowledge, there is very few existing empirical research assessing tobacco and alcohol use among MMT clients (Nyamathi et al., 2009b), especially in the rural mountainside where outreach services are limited (Office, V.G.S., 2014). A previous study in Vietnam urban and rural settings found that 87.3% of MMT patients were current smokers and 29.6% were hazardous drinkers (Do et al., 2017). This study, therefore, aimed to examine the prevalence of tobacco and alcohol consumption and related factors among MMT patients in the Vietnamese rural mountainside.

2. Materials and methods

2.1. Study setting and sampling method

A cross-sectional study was conducted from May to August 2016 in Tuyen Quang Province in Northeastern Vietnam. Tuyen Quang is a mountainous province, which is located in the Northern Vietnam. The main terrains of this province are high mountains and deep valleys. Tuyen Quang has a population of > 760,000 people (2015) with 22 ethnics; and most of them work in agriculture and hospitality sectors.

There were three MMT clinics in the study setting: Tuyen Quang Province clinic (a third-grade urban city because it belongs to Tuyen Quang Province), Yen Son District clinic (a rural area), and Son Duong District clinic (a rural area), where a combined total of 338 illicit drug users were receiving methadone treatment. In the end, we excluded Yen Son District, where only 9 patients were receiving MMT. The majority of patients enrolled in this study were being treated in Tuyen Quang clinic (284 patients), and 95 patients were being treated in the Son Duong clinic.

A convenience sampling method was used to recruit patients. Criteria for participation included: 1) receiving MMT in either of the enrolled sites; 2) being present at the clinic during the study period; 3) being at least 18 years old; 4) being able to answer the questionnaire (being able to speak because we collect data through face-to-face interview and not suffer from cognitive disorders); and 5) agreeing to participate. Those met all above-mentioned criteria would be invited to a private room and confirm their enrollment by signing the written informed consent form. We enrolled a total of 241 patients in the study, with a response rate of 80–90% across the two selected sites. The reasons for not participations included: 1) having busy work; 2) being worried about privacy; and 3) unable to answer due to sickness.

2.2. Measurements and instruments

Data were collected by face-to-face interviews in around 20–25 min using a structured questionnaire presented as paper forms. Data collectors were well-trained Masters of Public Health students and staff from Hanoi Medical University. In order to avoid potential bias, clinic staffs did not interview MMT patients.

2.2.1. Socioeconomic characteristics

The socioeconomic characteristics that we measured included: age, gender, education level, marital status, employment, and household monthly income. Household monthly income was then separated into five quintiles, from “poorest” to “richest”.

2.2.2. Health status

We employed the EQ-5D-5L to assess health-related quality of life of MMT patients. The Vietnamese version of EQ-5D-5L was translated and adopted as well as validated elsewhere (Tran et al., 2011; Tran, Ohinmaa, & Nguyen, 2012). The questionnaire consists of five domains: Mobility, Self-care, Usual activities, Pain/Discomforts and Anxiety/Depression, with five levels of severity: no problems, slight problems, moderate problems, severe problems, and extreme problems, giving 3125 (5⁵) possible health states with respective single indexes (Rabin et al., 2011). We also used EQ-VAS to record patients' perception of their current health status with the score ranging from 0 “The worst health state that you could imagine” to 100 “The best health state that you could imagine” (Rabin et al., 2011).

2.2.3. Alcohol drinking

We screened high alcohol consumption and abuse by using the Alcohol Use Disorders Identification Test-Consumption (AUDIT-C) (Bradley et al., 2007). The Vietnamese version of this tool was validated elsewhere (Tran et al., 2013; Tran et al., 2014). It consists of three questions, with patients receiving a total score from 0 to 12. Higher

scores suggest the higher risk of alcohol dependence. A score of > 4 for males and > 3 for females were used to classify those individuals at risk of hazardous drinking (Bradley et al., 2007). Patients were categorized at risk of binge drinking if the question “How often do you have six or more on one occasion” received any positive response (Broyles et al., 2011).

2.2.4. Smoking-related characteristics

Patients' current smoking status was classified into three main groups: current smokers, former smokers, and never-smokers. Those who had smoked at least 100 cigarettes during their lifetime and had smoked in the last 30 days were categorized as current tobacco users. Those that had smoked 100 cigarettes in their lifetime but had not smoked in the last 30 days were defined as former smokers. Participants who had never smoked 100 cigarettes and had not been smoking were classified as never-smokers. We also assessed levels of nicotine dependence by utilizing the *Fagerström test for nicotine dependence* (FTND) (Heatherton et al., 1991; Pomerleau et al., 1994). There was a total of six items: the age of first tobacco use, the number of cigarettes smoked daily, the most difficult time patients had when trying to give up smoking, whether they smoked in smoke-free areas, whether they smoked in the morning, and if they suffered illness. We classified FTND scores into five groups regarding the levels of nicotine dependence: 0–2: very low, 3–4: low, 5: moderate, 6–7: high and 8–10: very high. The total scores ranged from 0 to 10, where higher scores suggested higher nicotine dependence. In addition, water-pipe smoking is popular in Vietnam (Shelley et al., 2017). Therefore, we also asked patients to report their water pipes use for smoking. Three water pipes were set to equal one cigarette in order to calculate the number of cigarettes used (Chi, Ngo, & Nguyen, 2006).

2.2.5. Illicit drug use

We also examined whether the patients were current drug users in the last 30 days or not and the duration of MMT by self-reported questionnaires.

2.3. Statistical analysis

We analyzed collected data by using STATA version 12.0 (Stata Corp. LP, College Station, United States of America). First, we examined demographic characteristics, reported in frequencies, and compared them in different duration of MMT: short term (< 12 months), medium term ($12 \leq 24$ months) and long term (> 24 months). Chi-square test was used to assess differences of categorical variables, while Kruskal-Wallis test was employed to detect differences of continuous variables among these groups.

We utilized multivariate logistic and Tobit regressions to identify the factors associated with smoking, the FTND score, and hazardous drinking behavior. Since the previous study found that duration of MMT has non-linear relations with smoking rates and nicotine dependence, we also combined two regression models with a multivariate fractional polynomial model for the duration of MMT (Do et al., 2017). In order to shape reduced models, we used stepwise backward selection strategies. A threshold of p -values < 0.2 for the log-likelihood ratio test was used to include variables in the model. These strategies first included all covariates into the models. After that, the variable with the largest p -value was removed, then the model tested the p -value of remained variables again. This process continued until reaching the stopping threshold of p -values < 0.2 for all variables in the final model. We selected this threshold to ensure that we did not exclude any meaningful factors associated with the outcomes of interest.

3. Results

Table 1 indicates demographic characteristics of respondents. Among a total of 241 enrolled participants (100% male), the number of

patients treated in Tuyen Quang clinic doubled that in Son Duong clinic (69.3% and 30.7% respectively). The majority lived with their partner/spouse. Approximately 13% of respondents were current drug users. Nearly one-third of respondents have currently received ARV treatment. Otherwise, just two of the participants are female.

Smoking patterns among MMT patients are shown in Table 2. The mean age of first smoking was 17.9 years old (SD = 2.8). Among 230 respondents, 75.7% were current smokers and most of them smoked < 20 cigarettes per day (95.6%). The mean FTND score was 6.1 (SD = 1.3). While 82.8% of smokers reported moderate and high levels of nicotine dependence, only 15.2% reported the low level of nicotine dependence.

Table 3 illustrates alcohol drinking pattern among MMT patients. The proportion of people at risk of binge and hazardous drinking accounted for 22.4% and 18.3%, respectively.

Fig. 1 indicates that while early opioid treatment was associated with higher nicotine dependence, prolonged opioid treatment was linked with a greater risk of hazardous drinking. Also, the Audit-C score was increasing in patients with MMT duration about 1 year then decrease over time.

Factors related to smoking and alcohol drinking among MMT patients are highlighted in Table 4. People receiving treatment in Son Duong clinic (OR = 0.47; 95%CI = 0.23–0.96) and had problems in usual activities (OR = 0.20; 95%CI = 0.06–0.70) were less likely to be smokers. EQ-VAS score (Coef. = 0.03; 95%CI = 0.02–0.05) and having problems in mobility (Coef. = 0.72; 95%CI = 0.03–1.42) was found to be associated with the increase of nicotine dependence. In terms of alcohol drinking, people with other jobs were more likely to drink hazardously compared to unemployed patients (OR = 2.86; 95%CI = 1.20–6.82). Similarly, patients having higher duration of MMT had higher likelihood of being hazardous drinkers (OR = 1.07; 95%CI = 1.01–1.13).

4. Discussion

This study highlights a high prevalence of smoking among methadone patients in the Vietnamese mountainside area. The prevalence of smokers in our study was much higher than Vietnamese male adults (45.3%) (Van Minh et al., 2017), but lower than the prevalence among MMT patients in previous study in urban and rural area of Vietnam (with 87.3% male patients being current smokers) (Do et al., 2017). This can be explained by the fact that our study was carried out in a rural mountainous area where tobacco-related products were difficult to find compared to rural and urban areas (Xuan le et al., 2013). In addition, those addicted to illicit drugs in mountainous areas perceive more severe drug and HIV-related stigmatization (Pharris et al., 2011). Previous study shows that stigma was linked with mental health suffers from exposure to chronic stress (Krieger, 1999; Young et al., 2005), and may rely on tobacco to release this unrewarded mood (Parrott, 1999). Balfour DJ et al. revealed that nicotine can alleviate stress and boost mood (Balfour & Fagerstrom, 1996). In addition, we also found that patients receiving MMT in the rural remote clinic (Son Duong) were less likely to be smokers than their peers in the urban clinic (Tuyen Quang). Smoking rates in urban setting have been found were higher than that in rural areas in many countries (Völzke et al., 2006; W.H.O., 2010; W.H.O., 2015; Włodarczyk et al., 2013), which may be due to the more stressful life in urban areas than rural ones (Völzke et al., 2006).

It is noteworthy that mobility impairment was associated with higher level of nicotine dependence. We supposed that people with mobility limitations were more likely to suffer anxiety/depression, which facilitated them to increasingly smoke (Borrelli, Busch, & Dunsiger, 2014; Niaura et al., 2001). In addition, people reporting higher EQ-VAS had higher level of nicotine dependence. We supposed that the interaction between nicotine and methadone offers MMT patients a more pleasurable experience, which helps them releasing physical and psychological problems, resulting in the increase of quality

Table 1
Demographic of respondents.

Characteristics	Duration ≤ 12 months		Duration 12–≤ 24 months		Duration > 24 months		Total		p-Value
	N	%	N	%	N	%	N	%	
Education									0.75
< High school	50	49.0	42	47.2	19	42.2	111	47.0	
≥ High school	52	51.0	47	52.8	26	57.8	125	53.0	
Marital status									0.03
Single	22	21.6	15	16.9	17	37.8	54	22.9	
Divorced/separate/widow	19	18.6	10	11.2	6	13.3	35	14.8	
Live with spouse/partner	61	59.8	64	71.9	22	48.9	147	62.3	
Employment									0.25
Unemployment	9	8.8	2	2.3	4	8.9	15	6.4	
Self-employed	45	44.1	45	50.6	22	48.9	112	47.5	
Worker/farmer	19	18.6	16	18.0	3	6.7	38	16.1	
Others	29	28.4	26	29.2	16	35.6	71	30.1	
Location									0.01
Tuyen Quang	65	63.7	58	65.2	44	88.0	167	69.3	
Son Duong	37	36.3	31	34.8	6	12.0	74	30.7	
Having pain/discomforts	16	15.7	18	20.2	13	28.9	47	19.9	0.18
Having anxiety/depression	26	25.5	21	23.6	14	31.1	61	25.9	0.64
Current ARV treatment	23	22.8	22	25.0	8	18.2	53	22.8	0.68
Current drug use	20	20.0	6	6.8	5	11.4	31	13.4	0.03

	Mean	SD	Mean	SD	Mean	SD	Mean	SD	p-Value
Age	39.5	8.1	41.6	7.6	40.2	5.5	40.4	7.5	0.02
Household monthly income (mil VND)	14.9	30.4	13.6	9.0	11.3	6.6	13.7	21.0	0.17
EQ5D - index	0.9	0.2	0.9	0.2	0.9	0.2	0.9	0.2	0.65
EQ-VAS	81.9	16.3	81.1	13.5	83.3	16.5	81.8	15.3	0.15

Mil VND: Million Vietnam Dong; EQ-5D index: an utility score ranged from 0 for death to 1 for perfect health; EQ-VAS: Visual Analogue Scale.

Table 2
Smoking patterns among MMT patients.

Characteristics	Duration ≤ 12 months		Duration 12–≤ 24 months		Duration > 24 months		Total		p-Value
	N	%	N	%	N	%	N	%	
Smoking									0.23
Current smoking	72	72.7	71	80.7	31	72.1	174	75.7	
Former smoking	2	2.0	1	1.1	3	7.0	6	2.6	
Never smoking	25	25.3	16	18.2	9	20.9	50	21.7	
Number of cigarettes per day									0.21
≤ 10	36	46.2	36	50.0	17	54.8	89	49.2	
10–20	38	48.7	35	48.6	11	35.5	84	46.4	
21–30	2	2.6	0	0.0	0	0.0	2	1.1	
> 31	2	2.6	1	1.4	2	6.5	5	2.8	
Unknown	0	0.0	0	0.0	1	3.2	1	0.6	
Smoking within 5 min of waking	25	31.7	16	21.1	4	11.1	45	23.6	0.12
Difficult to refrain from forbidden smoking places	53	67.1	38	50.7	20	55.6	111	58.4	0.11
Times that hating to give up smoking									0.01
The first in the morning	40	50.6	27	36.0	21	58.3	88	46.3	
After meal	17	21.5	12	16.0	2	5.6	31	16.3	
Others	9	11.4	7	9.3	6	16.7	22	11.6	
No problem	13	16.5	29	38.7	7	19.4	49	25.8	
Smoke more frequently in the morning	41	54.0	30	40.0	15	41.7	86	46.0	0.19
Smoke even sick in bed	14	17.7	14	18.9	5	13.9	33	17.5	0.81
Nicotine dependent level									0.60
Low	10	14.7	11	19.0	2	8.0	23	15.2	
Moderate	46	67.7	36	62.1	20	80.0	102	67.6	
High	12	17.7	11	19.0	3	12.0	26	17.2	

	Mean	SD	Mean	SD	Mean	SD	Mean	SD	p-Value
Age at first smoking	17.9	2.8	17.5	3.3	18.8	3.7	17.9	3.2	0.20
Years of regular smoking	18.2	9.1	17.6	9.6	15.8	6.8	17.5	8.9	0.51
FTND score	6.2	1.3	6.0	1.4	6.1	1.3	6.1	1.3	0.70
Monthly payment for cigarettes	284.4	357.8	287.5	342.5	308.7	310.8	289.8	342.4	0.67

FTND score: score calculated using Fagerström test for nicotine dependence.

Table 3
Alcohol drinking pattern among MMT patients.

Characteristics	Duration ≤ 12 months		Duration 12–≤ 24 months		Duration > 24 months		Total		p-Value
	N	%	N	%	N	%	N	%	
Frequency to have a drink containing alcohol									
Never	75	75.8	52	58.4	29	64.4	156	67.0	0.11
Monthly	9	9.1	16	18	5	11.1	30	12.9	
Weekly	4	4.0	9	10.1	1	2.2	14	6.0	
2–3 times/week	6	6.1	5	5.6	6	13.3	17	7.3	
> = 4 times/week	5	5.1	7	7.9	4	8.9	16	6.9	
Number of standard drinks in a typical day									
1–2 cups	79	86.8	60	69.8	35	79.6	174	78.7	0.05
3–4 cups	6	6.6	11	12.8	3	6.8	20	9.1	
5–6 cups	4	4.4	5	5.8	5	11.4	14	6.3	
7–9 cups	2	2.2	4	4.7	0	0.0	6	2.7	
> 9 cups	0	0.0	6	7.0	1	2.3	7	3.2	
Frequency to have six or more drinks on one occasions									
Daily	0	0.0	2	5.7	1	7.7	3	4.2	0.42
Less than month	13	56.5	12	34.3	8	61.5	33	46.5	
Monthly	3	13.0	8	22.9	0	0.0	11	15.5	
Never	4	17.4	10	28.6	3	23.1	17	23.9	
Weekly	3	13.0	3	8.6	1	7.7	7	9.9	
Hazardous drinking	12	11.8	22	24.7	10	20.0	44	18.3	0.07
Binge drinking	19	18.6	25	28.1	10	20.0	54	22.4	

	Mean	SD	Mean	SD	Mean	SD	Mean	SD	p-Value
AUDIT-C score	5.1	1.7	4.9	2.5	4.9	2.4	5.0	2.3	0.92

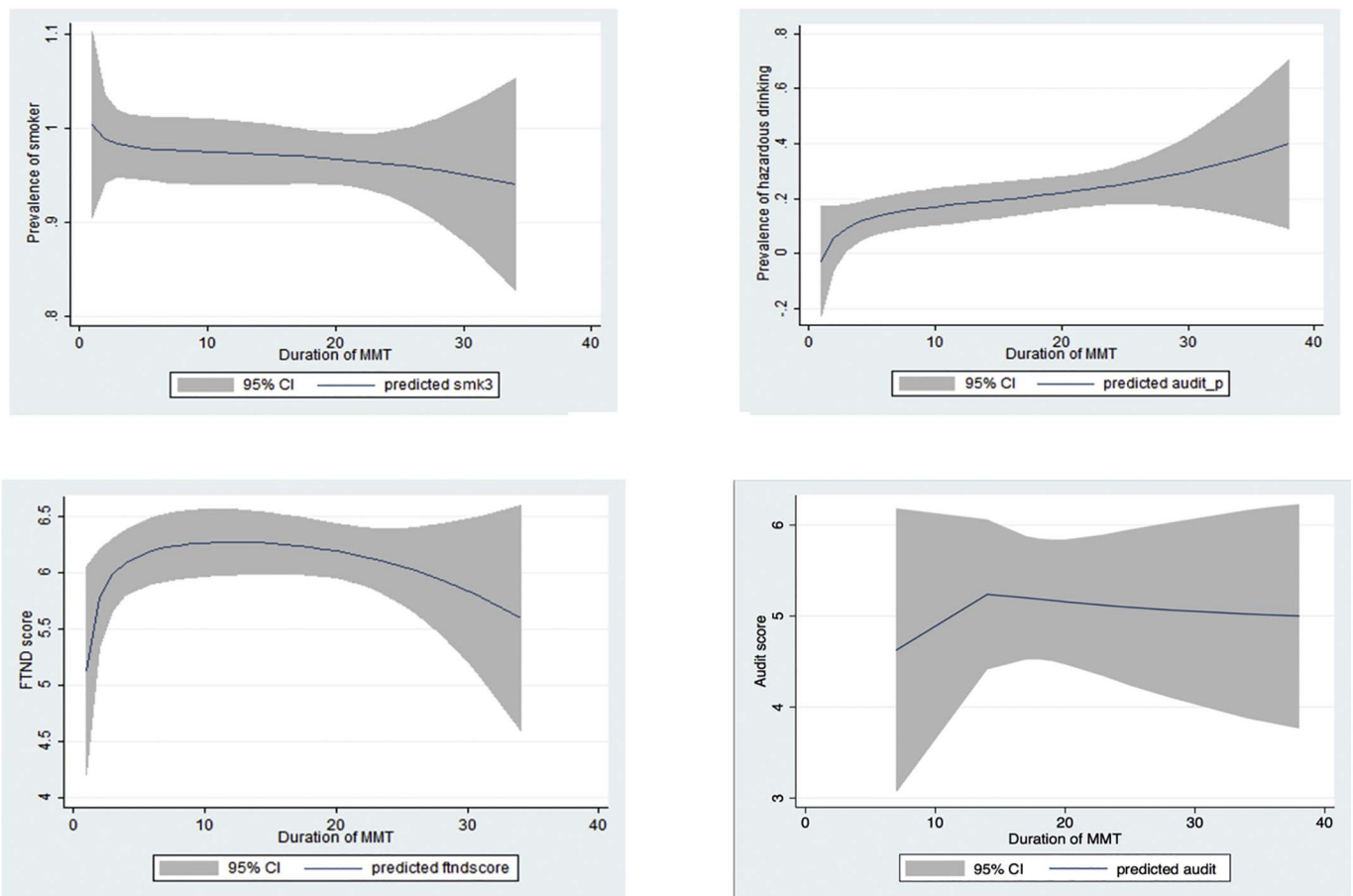


Fig. 1. Smoking and alcohol drinking behaviors among MMT patients regarding MMT duration.
a) Prevalence of current smoker; b) FTND score; c) Prevalence of hazardous drinker; d) Audit-C score.

Table 4
Associated factor with smoking and alcohol drinking.

Characteristics	Current smoking		FTND score		Hazardous drinking	
	OR	95% CI	Coef.	95% CI	OR	95% CI
Age	0.97	0.93; 1.02				
Employment (vs Unemployment)						
Others					2.86*	1.20; 6.82
Income quintiles (vs poorest)						
Poor			0.51	– 0.09; 1.11		
Middle	1.89	0.76; 4.68				
ARV treatment (yes vs no)			– 0.50	– 1.07; 0.07		
Location (Son Duong vs Tuyen Quang)	0.48*	0.23; 0.97				
Having problem in mobility			0.72*	0.03; 1.42		
Having problem in usual activities (yes vs no)	0.20*	0.06; 0.71				
Pain/discomforts (yes vs no)	2.48	0.67; 9.19			0.43	0.15; 1.26
Duration of MMT					1.07*	1.01; 1.13
EQ-VAS	0.98	0.95; 1.01	0.03*	0.01; 0.05		

* $p < 0.05$.

of life (Richter et al., 2004; Richter et al., 2007b).

Nonetheless, we could not find any clear associations between the level of nicotine dependence and duration of MMT. Previously, Huyen et al. in their study in Vietnam urban and rural areas indicated that the level of nicotine dependence was high in the initial phase, then decreased afterward (Do et al., 2017). Small sample size and different study settings may be used to explain the differences between this prior study and ours. The authors argued that those received initial methadone treatment are vulnerable to overdose problems (Region, W.H.O.W.P., 2009) and withdrawal symptoms due to low dosage, leading to mental and physical health suffers, thus, they tend to rely on nicotine to ease discomfort (Ditre et al., 2011).

Noticeably, the rate of hazardous drinking among MMT patients in our study was lower than the Vietnamese male adults (40%) (Van Bui et al., 2016) and male MMT patients in urban and rural areas (29.6%) (Do et al., 2017). This figure was also lower than that in some countries such as Taiwan (31.4%) (Chen et al., 2011) and the United States (46%) (Nyamathi et al., 2009a). Various studies claim that drinking among methadone patients may be linked to low self-esteem (Bennett, 1988; Rengade et al., 2009). We also found that prolonged MMT was linked with hazardous drinking. Data on levels of alcohol dependence during opioid treatment has been controversial. Some studies have shown a decrease in alcohol use regarding methadone treatment period (Best et al., 2002), while others reported a steady alcohol intake (Fairbank, Dunteman, & Condelli, 1993; Rittmannsberger et al., 2000). It, perhaps, can be hypothesized that although the methadone supplement helps patients to abstain from the illicit drug, patients tend to intake alcohol as a substitute substance (Ottomanelli & Gennaro, 1999). We also found that patients having jobs were more likely to drink hazardously compared to unemployed patients. It should be noted that in Vietnamese traditions, alcohol drinking has become a sociocultural norm, especially when people wants to connect with their colleagues and friends (Lincoln, 2016). This may create substantial challenges to refuse alcohol. Therefore, interventions including alcoholism counseling sessions and family and social involvement should be considered in the later period of methadone treatment.

There are several implications drawn from this study. First, the comprehensive approach in methadone treatment, which recommends that combine medical care and mental wellness is needed to thoroughly address smoking and drinking among MMT patients. Second, mass community-based behavior change campaigns should be implemented especially in the rural mountainside areas to reduce stigma against the most-at-risk population. This can be done by raising knowledge and awareness about HIV/AIDS via media, and people should view drug addiction as a disease rather than social evils. This, in turn, would help reduce stress, alcohol and tobacco use among methadone patients.

Third, attention should be drawn to reducing physical and mental suffering during the initial methadone treatment. Last, alcohol and tobacco counseling sessions integrated into mountainous MMT clinics in combination with social and family supports could encourage methadone patients to abstain from these non-opioid substances.

Our study has several limitations. First, this sample only included illicit drug users who had received MMT services. Moreover, in the current study, we employed the convenience sampling technique to enroll patients, which might limit the generalization of our findings to the whole MMT population. Second, the cross-sectional design used in this study could not help to draw the casual relationships between MMT duration and tobacco, alcohol dependence. Ideally, a longitudinal study should be conducted to elucidate these gaps. Third, some potential covariates such as duration of drug use, methadone dose, etc. were not collected, suggesting further studies to investigate the relationships between these variables and smoking and alcohol use among MMT patients. Finally, self-reported data collection may lead to recall bias.

5. Conclusions

This study highlights the low rate of alcohol abusers but a considerably high proportion of current smokers among MMT patients in the rural mountainside area. In order to reduce alcohol and tobacco abuse, a comprehensive approach is needed to improve both physical and mental health outcome. In addition, implementing mass community-based behavioral change campaigns to reduce drug addiction-related stigmatization should also be prioritized. Alcohol and tobacco counseling programs combined with social and family support also play an essential role in alcohol and tobacco control.

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