

BMJ Open Concurrent drug use among methadone maintenance patients in mountainous areas in northern Vietnam

Bach Xuan Tran,^{1,2} Victoria L Boggiano,³ Huong Lan Thi Nguyen,⁴ Long Hoang Nguyen,⁵ Hung Van Nguyen,⁶ Canh Dinh Hoang,⁶ Huong Thi Le,¹ Tho Dinh Tran,⁷ Hai Quan Le,⁸ Carl A Latkin,² Thuc Minh Thi Vu,⁹ Melvyn WB Zhang,¹⁰ Roger CM Ho¹¹

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BXT and VLB contributed equally.

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ABSTRACT

Objectives With the rise in methadone maintenance therapy (MMT) for drug users in Vietnam, there has been growing interest in understanding if and how often MMT patients engage in concurrent illicit drug use while on methadone therapy in various settings. This study examined factors associated with concurrent opioid use among patients on MMT in a mountainous area in Vietnam.

Setting One urban and one rural MMT clinics in Tuyen Quang province.

Participants Survey participants consisted of patients who were taking MMT at the selected study sites. A convenience sampling approach was used to recruit the participants.

Primary and secondary outcome measures Participants were asked a series of questions about their socioeconomic status, current alcohol and tobacco use, health problems (measured by the EuroQol-Five Dimension-Five Level instrument), psychological distress (measured by Kessler score), and factors associated with current and/or previous drug use. Regression models were used to determine factors associated with concurrent drug use among MMT patients.

Results Among the 241 male MMT patients included in the study, 13.4% reported concurrent opioid use. On average, the longer patients had been enrolled in MMT, the less likely they were to concurrently use drugs. Conversely, patients with higher levels of psychological distress were more likely to engage in concurrent drug use while on MMT.

Conclusion Longer duration of MMT was significantly correlated with reduced illicit drug use among participants. Higher levels of psychological distress were associated with increased use of illicit drugs among MMT patients. Regardless of distance, long-term MMT is still effective and should be expanded in mountainous areas.

INTRODUCTION

Injection drug use is a pressing problem across Vietnam. The Vietnamese government cites the number of people who inject drugs (PWID) nationwide to be approximately 146 731.¹ PWID are present in 90% of the districts in Vietnam, highlighting the

Strengths and limitations of this study

- The study has a large number of individuals currently enrolled in methadone maintenance therapy (MMT) from mountainous settings in northern Vietnam.
- The study measures several aspects of patients' drug use behaviours, both before and during the MMT programme.
- A convenience sampling method was used, which limited the generalisability to all MMT patients in Vietnam.

widespread nature of this epidemic. They are at increased risk of contracting a variety of infectious diseases.¹ Indeed, the majority of new HIV infections in Vietnam occur among injection drug users,² and HIV-positive patients in Vietnam who use drugs have delayed access to care and generally poor adherence to antiretroviral treatment (ART) regimens.^{3,4}

Methadone maintenance treatment (MMT) has shown significant promise as a way to reduce opiate addiction among PWID in Vietnam. MMT programmes in Vietnam have been extensively studied in recent years, and have been shown to reduce opiate use and other risk behaviours among enrollees,⁵⁻⁷ with a concurrent overall increase in patients' quality of life.⁴ These results are similar to what has been found with some MMT roll-out in other low-income/middle-income and developed countries across the globe.^{8,9} However, other researchers working in low-income/middle-income countries have found that even when patients are enrolled in MMT programmes, there remains an urgent need to address concurrent opioid use.¹⁰ The length of time using drugs may impact whether being enrolled in an MMT programme reduces illicit substance use.¹¹ Alcohol and tobacco use, as well as psychiatric



For numbered affiliations see end of article.

Correspondence to

Assoc. Prof. Dr. Bach Xuan Tran; bach.jhu2@gmail.com

and other physical comorbidities, also impact whether or not an MMT programme is effective at reducing heroin use. Overall, more work is needed to fully elucidate the relationship between MMT programmes and concurrent drug use.

Among patients living with HIV/AIDS, MMT programmes have been shown to improve their access to and adherence with ART guidelines.¹² The Vietnam Ministry of Health (MoH) began to pilot the first national MMT programme for PWID in 2008, in an effort to both reduce illicit substance use and curb the HIV/AIDS epidemic in the country.¹³ Indeed, MMT programmes in Vietnam have been shown to drastically reduce concurrent opioid use among HIV-positive PWID.¹⁴ A study of Tran *et al*¹² found that only 14.4% of MMT patients at clinics in two metropolitan areas had positive heroin urine test after 9 months of treatment. In addition, another study in Hanoi and Nam Dinh showed that with the mean treatment duration of 16.5 months, the rate of concurrent drug use among MMT patients was 4.8%.⁶ Higher age, poor health status and low socioeconomic status were previously found to be associated with the concurrent drug use.^{6,12} However, none of them mention the effects of MMT on patients living in remote or mountainous sites, which may have distinguished barriers and cultures that influence the concurrent illicit drug use compared with the rural and urban areas.

We have implemented an evaluation of the MMT programme in Tuyen Quang, a mountainous province, to inform the development of strategic plan for expanding services in this area. We applied a system approach in health service research, which combined multiple services indicators and patients' responses. Some articles have been written using the same data set and made available examining different aspects of MMT from the patients' perspectives including health service use, stigmatisation and patients' adherence.^{15–17} Because of the potential benefits of MMT programmes in reducing drug use and improving patients' quality of life, there is increased attention being paid to the impact that enrolment has on their risk-taking behaviours. This study looked at factors associated with concurrent drug use among patients enrolled in MMT programmes in mountainous parts of northern Vietnam, to identify ways to best intervene and reduce illicit substance use among MMT patients in these regions.

MATERIALS AND METHODS

Study setting and sampling method

A cross-sectional study was carried out from May to August 2016 in Tuyen Quang province, a mountainous province in northern Vietnam. Tuyen Quang has more than 760 000 people (2015) living in an area of 5867.9 km². The dominant terrains in Tuyen Quang are hills, valleys and mountains (accounting for 80% of the area).¹⁸ In Tuyen Quang province, three MMT clinics, namely Tuyen Quang City, Son Duong and Yen Son, have been opened.

Most of the patients were enrolled in the first two clinics, while only nine patients received treatment in the third clinic. All clinics are operated under the instruction of the MoH.¹⁹ First, opioid-dependent individuals may register to participate in the MMT programme by themselves or be referred to the clinics by physicians. After receiving health check-ups, blood and urine testing, and psychological counselling sessions, the patient's initial dose is identified. Then, the application form of the patient will be reviewed by a committee before having a final decision for enrolment. If the application is accepted, the patient starts to enrol in the MMT programme. In this study, Tuyen Quang City and Son Duong clinics were selected. The former clinic represents an urban part of the mountainous region, while the latter reflects the context of a more rural part.

Survey participants consisted of patients who were taking MMT at the selected study sites. The eligibility criteria included (1) taking or initiating MMT at the selected sites; (2) presenting at clinics during study periods; (3) being 18 years or older; (4) having the ability to answer the questionnaire within 20 min; and (5) agreeing to participate in the study. A convenience sampling approach was applied, wherein all eligible clients were invited to enrol in the study and given written informed consent if they agreed to participate. Patients were invited to a private room in the clinic to ensure patient confidentiality and to create a more pleasurable atmosphere for the interview. All information from patients was assured to be kept confidentially. A convenience sample of 241 patients were enrolled in the study, and the response rate was 80%–90% across sites. Because only nine female patients enrolled in the MMT programme in two clinics and they refused to be participants, the sample of this study was 100% male.

Measurements and instruments

Well-trained interviewers including students in the Master of Public Health degree programme at the Hanoi Medical University conducted face-to-face interviews with all participants using a structured questionnaire. Health staffs of the centre were not included in the data collection team to prevent any social desirability bias. In drug use measurement, data from self-reported and urine drug test approaches had similar validity; therefore, self-report data can be used to collect information about drug use behaviours.^{20,21} However, to minimise recall bias, some cross-check questions were employed to ensure the accuracy of self-reported information from patients, especially for primary outcomes.

Socioeconomic characteristics

Patients' age, gender, ethnicity, marital status, education level, employment status, religion and household monthly income were measured. Household monthly spending was measured in two ways: recurring/regular expenditures, including all money spent on food, clothes, rent, utilities, education and others in the last 30 days; and non-recurring/irregular expenditures, including

healthcare costs, furniture, special occasions, travel and others incurred in the last 12 months.²²⁻²⁴

Health status

The EuroQol-Five Dimension-Five Level (EQ-5D-5L) instrument was used to measure patients' health-related quality of life. This descriptive system measures patients' well-being across five domains: mobility, self-care, usual activities, pain/discomfort and anxiety/depression, with five levels of responses: no problems, slight problems, moderate problems, severe problems and extreme problems. The scale thus gives 3125 health states with respective single indexes. The interim scoring for the EQ-5D-5L was computed using a cross-walk value set from Thailand, because such a metric is not available for Vietnamese patients.^{25 26} The Vietnamese version of EQ-5D-5L was translated and adopted and has been validated elsewhere.^{16 17 26-32} Patients were also asked about their HIV status and whether they were suffering from any current acute or chronic diseases.

The Kessler Psychological Distress Scale was used to measure MMT patients' mental health. This is a well-validated tool that has been used among the Vietnamese-speaking population.^{33 34} It measures psychological distress using a 10-item questionnaire. Each question pertains to an emotional state, with a five-level response scale from 'None of the time' to 'All of the time'. The score ranges from 10 to 50. The higher the score, the higher the patient's level of psychological distress.

Alcohol habits

The Alcohol Use Disorders Identification Test-Consumption (AUDIT-C) was used to screen patients for heavy drinking.³⁵ The AUDIT-C contains three questions that lead to a band score of (0; 12). The higher the score, the greater the risk of alcohol dependence. Male respondents who score 4 or higher and female respondents who score 3 or higher are categorised as hazardous drinkers.³⁵ The Vietnamese version of this tool has been translated, validated and used elsewhere.³⁶⁻³⁸

Smoking-related characteristics

Participants who had smoked at least 100 cigarettes in their entire lives and had smoked within the last 30 days were classified as current cigarette smokers.^{39 40}

Illicit drug use and rehabilitation

Data on participants' history of intravenous drug abuse, current drug use, patients' history of drug rehabilitation, reasons for relapse and whether family members used illicit drugs were also collected in this study.^{15 31 33 41 42}

MMT adherence

We measured MMT adherence using the standard of MoH with three questions: (1) number of days that they missed doses in the last 4 days; (2) whether they missed doses in the last weekend; and (3) when they missed the last dose within the last 3 months.¹⁵ Patients were classified into 'optimal adherence' if they said 'No' to all

Table 1 Demographic characteristics of respondents

Characteristics	n (%)
Age group	
<35	55 (22.8)
35 to <50	151 (62.7)
≥50	35 (14.5)
Gender	
Male	241 (100.0)
Education	
Primary school and below	29 (12.3)
Secondary school	82 (34.8)
High school	106 (44.9)
College/vocational training	12 (5.1)
University and above	7 (3.0)
Marital status	
Single	54 (22.9)
Live with spouse/partner	147 (62.3)
Divorced/separate	27 (11.4)
Widow	8 (3.4)
Employment	
Unemployed	15 (6.4)
Self-employed	112 (47.5)
Worker/farmer	38 (16.1)
Others	71 (30.1)
HIV-positive	
Current antiretroviral treatment	53 (22.8)
Current smoker	174 (75.7)
Hazardous drinking	44 (18.3)
Having acute diseases	53 (22.0)
Having chronic diseases	39 (16.2)
Having problems in mobility	33 (14.0)
Having problems in self-care	25 (10.6)
Having problems in usual activities	34 (14.4)
Having pain/discomfort	47 (19.9)
Having anxiety/depression	61 (25.9)
Total	241 (100.0)

questions; otherwise, they were identified as 'sub-optimal' adherence.¹⁹

Statistical analysis

Data were analysed using STATA V.12.0 software. Student's t-test was used to assess differences of the parametric continuous variables between current and former drug users. χ^2 and Fisher's exact tests were applied to determine differences among categorical variables. A P value <0.05 was considered statistically significant. For missing data, some authors argued that a rate of missing data under 5% does not influence analysis.^{43 44} In our study, the highest proportion of missing data was 4.6% for the

Table 2 History of drug use among respondents

Characteristics	MMT duration ≤12 months		MMT duration >12 months		Total		P value (χ ² test)	
	n	%	n	%	n	%		
Total	102	42.3	139	57.7	241	100.0		
Ever injecting drugs	99	98.0	129	97.0	228	97.4	0.62	
Number of drug rehabilitation								
None	18	17.7	17	12.2	35	14.5	0.60	
1 time	29	28.4	43	30.9	72	29.9		
2 times	19	18.6	32	23.0	51	21.2		
>2 times	36	35.3	47	33.8	83	34.4		
Reasons for relapse								
Bored	17	30.9	42	50.6	59	42.8	0.02	
Invitation from friends	62	87.3	77	85.6	139	86.3	0.75	
Craving	50	75.8	81	79.4	131	78.0	0.58	
Lay-off	6	11.1	6	8.6	12	9.7	0.64*	
Others	0	0.0	1	1.4	1	0.8	0.39*	
People using drugs in family								
Nobody	85	83.3	96	69.1	181	75.1	0.01	
Spouse	1	1.0	5	3.6	6	2.5	0.20*	
Parents	2	2.0	6	4.3	8	3.3	0.31*	
Brother/sister	5	4.9	11	7.9	16	6.6	0.35	
Relative	5	4.9	12	8.6	17	7.1	0.26	
Others	3	2.9	3	2.2	6	2.5	0.70*	
			Mean	SD	Mean	SD	Mean	SD
Age at first drug use			24.5	7.7	24.3	7.7	24.4	7.6
Months of drug use			161.8	88.9	173.4	79.7	168.4	83.8
Age at first drug injection			28.8	9.2	29.4	8.4	29.2	8.7
Number of drug injection per month			33.0	38.9	27.6	28.1	30.8	34.6

*Fisher's exact test.

MMT, methadone maintenance therapy.

P value in bold is less than 0.05.

variable current smoking, implying that our missing data rates can be ignored.

Logistic regression was used to identify the predictors of the outcome 'Concurrent drug use'. Meanwhile, Tobit regression was used to identify factors related to 'Non-drug using day'. Because the latter outcome is censored data (with range from 0 to 30 days), Tobit regression model, which is called censored regression, seemed to be appropriate for analysing this outcome. The full model included a priori-defined variables such as socioeconomic status, health status and behaviours. Stepwise backward selection strategies were employed to produce reduced models. A log-likelihood ratio test with a threshold P value <0.2 was used to exclude the variables.

RESULTS

Among 241 patients enrolled in this study, more than half of the respondents were living with spouse/partner

(62.3%), finished high school and above (53%), and were unemployed or had an unstable job (53.9%). Current smokers accounted for 75.7% of the participants, and 18.3% were classified as hazardous drinkers. In addition, approximately a quarter of respondents were HIV-positive. A large proportion of patients suffered from at least one acute or chronic disease (table 1).

Table 2 shows that the majority of patients had injected drugs in the past (97.4%) and were in drug rehabilitation programmes at least once (85.5%). A large number of respondents relapsed due to the invitation from friends (86.3%). Most of the respondents had relapsed due to friends (86.3%) and craving (78.0%).

Table 3 shows that among 232 patients answering this question, approximately 20% who had undergone less than 12 months of MMT treatment used drugs, which was significantly higher than other patients (P<0.05). Patients with concurrent drug use also had statistically significantly

Table 3 Current drug use among respondents

Characteristics	No		Yes		Total		P value
	n	%	n	%	n	%	
Total	201	86.6	31	13.4	232	100.0	
Age group							
<35	47	88.7	6	11.3	53	22.8	0.88
35 to <50	128	85.9	21	14.1	149	64.2	
≥50	26	86.7	4	13.3	30	12.9	
Sex							
Male	201	86.6	31	13.4	232	100.0	
Education							
Below high school	90	82.6	19	17.4	109	47.0	0.14
High school	97	91.5	9	8.5	106	45.7	
Above high school	14	82.4	3	17.7	17	7.3	
Marital status							
Single	46	86.8	7	13.2	53	22.8	0.68
Live with spouse/partner	124	85.5	21	14.5	145	62.5	
Divorced/separate/widow	31	91.2	3	8.8	34	14.7	
Employment							
Unemployed	11	78.6	3	21.4	14	6.0	0.79
Self-employed	97	88.2	13	11.8	110	47.4	
Worker/farmer	33	86.8	5	13.2	38	16.4	
Others	60	85.7	10	14.3	70	30.2	
HIV-positive	49	83.1	10	17.0	59	26.0	0.54
ART treatment	45	84.9	8	15.1	53	23.1	0.71
Current smoking	146	85.4	25	14.6	171	75.7	0.65
Hazardous drinking	40	90.9	4	9.1	44	19.0	0.36
Pain/discomfort	42	89.4	5	10.6	47	20.3	0.54
Anxiety/depression	52	85.3	9	14.8	61	26.3	0.71
MMT duration							
≤12 months	80	80.0	20	20.0	100	43.1	0.03
12 to <24 months	82	93.2	6	6.8	88	37.9	
≥24 months	39	88.6	5	11.4	44	19.0	
MMT adherence							
Optimal	70	85.4	12	14.6	82	35.3	0.67
Suboptimal	131	87.3	19	12.7	150	64.7	
	Mean	SD	Mean	SD	Mean	SD	
EQ-5D index	0.88	0.21	0.89	0.17	0.88	0.21	0.76
EQ VAS	81.5	15.2	82.8	15.8	81.6	15.2	0.67
Kessler score	15.8	6.4	18.4	7.1	16.2	6.6	0.04

ART, antiretroviral; EQ-5D, EuroQoL-Five Dimensions; EQ VAS, EuroQoL Visual Analogue Scale; MMT, methadone maintenance therapy. P-value in bold is less than 0.05.

higher Kessler score than those not using drug ($P<0.05$). Meanwhile, none of the differences were found in other factors.

Table 4 shows the factors related to current drug use and the number of non-drug-using days among MMT patients, using the reduced multivariate logistic and Tobit

regressions models. Those who finished high school or above were less likely to report current drug use. Duration of MMT was found to be associated with reduced likelihood of current drug use among those retained on MMT, while having higher Kessler scores (OR=1.08) (95% CI 1.01 to 1.16) during MMT substantially increased the

Table 4 Factors associated with current drug use among respondents

Characteristics	Concurrent drug use		Number of non-drug-using days in the last month	
	OR	95% CI	Coefficient	95% CI
Education (vs below high school)				
High school	0.31*	0.12 to 0.81		
Above high school			-14.36	-36.14 to 7.42
Number of drug rehabilitation (vs none)				
2 times	2.13	0.73 to 6.24		
ART treatment (yes vs no)			9.93	-2.81 to 22.67
Having problem in self-care (yes vs no)	0.30	0.05 to 1.80		
Pain/discomfort (yes vs no)			24.35**	6.44 to 42.26
Kessler score (range score 10–37)	1.08*	1.01 to 1.16		
MMT duration (from 1 to 38 months)	0.92**	0.87 to 0.98	0.99**	0.32 to 1.66

*P<0.05, **P<0.01.

ART, antiretroviral; MMT, methadone maintenance therapy.

risk of current drug use. Having pain/discomfort was associated with fewer numbers of non-drug-using days, while longer duration of MMT was associated with greater numbers of non-drug-using days. Notably, MMT adherence was excluded from reduced models, implying that there was no relationship between MMT adherence and concurrent drug use.

DISCUSSION

This study highlights the factors that are associated with concurrent drug use among Vietnamese patients enrolled in an MMT programme in two clinics in northern Vietnam. Overall, being enrolled in MMT was associated with a decreased rate of illicit drug use. This finding is consistent with other similar studies in Vietnam and elsewhere.^{12 45–47} In our study, longer duration of enrolment in MMT was associated with less concurrent illicit substance use, while having a higher level of psychological distress during MMT enrolment was associated with a significantly increased rate of concurrent opioid abuse.

The HIV/AIDS epidemic in Vietnam is largely driven by illicit substance use, and the primary driver of new HIV infections nationwide is drug injection. It is therefore crucially important to devise strategies to reduce injection drug use in high-risk parts of the country. Our study shows that MMT programmes represent one primary solution to this problem. Individuals who engage in MMT programmes for longer durations show overall reduced rates of concurrent drug use. However, this study also found that many patients enrolled in MMT continue to use drugs (13.4%). This rate was lower compared with MMT patients in other countries, such as China (24.9%–74.6%),^{10 48 49} USA (44%)⁵⁰ or Canada (78.3%).⁵¹ However, this is in line with previous studies that have found that among MMT patients in Vietnam, the rates of concurrent drug use are often between 11% and 14%.^{13 14} There are several possible reasons for this

phenomenon. First, northern mountainous provinces in Vietnam are considered epicentres of drug use; therefore, patients could access illicit drug easily.⁵² Second, drug users' social networks could continue to revolve around illicit substance use even when they enrol in MMT programmes, meaning patients may face pressure to continue using drugs with their peers.^{14 53} Third, the adherence of patients in mountainous settings might be low due to geographical barriers that diminish the accessibility of MMT clinics, which facilitates them to relapse.¹⁵

In the present study, higher Kessler scores—indicating higher levels of anxiety/depression and overall worse mental health—displayed greater rates of concurrent drug use alongside MMT. This result is not surprising; it has long been known that patients seek out illicit substance use when they are feeling depressed, sad or anxious. Indeed, past research looking at concurrent drug use among MMT patients found that patients with poor coping skills were more likely to engage in concurrent drug use.⁵³

The study suggested several potential implications. First, to fully enable patients to break their drug addiction, in addition to enrolment in MMT, patients must be provided social and behavioural modification support, such as providing them with new educational and workforce opportunities. Moreover, the involvement of families is critical to encourage as well as support patients to release the pressure from their lives and help them to quit drug use, as previously mentioned in the literature.¹² Second, our findings highlight the importance of improving mental healthcare services for drug-addicted patients, in addition to expanding MMT. MMT alone will help some patients quit injecting drugs, but for many others comprehensive care that includes both MMT and adequate mental health services is required to help them fully quit using drugs. Third, because commune health stations are the closest health facility for

patients,²⁹ decentralisation should be considered when planning the expansion of MMT programme.⁶ This solution could elevate the accessibility of treatment, eliminate the geographical barriers and facilitate the adherence, resulting in the abstinence of drug use among MMT patients.¹⁵

This study had several limitations. First, several important indicators such as methadone dose and stigma were not fully investigated in this study. Second, a convenience sampling method with a small sample size was used, which means that our findings may not be representative of all MMT patients in Vietnam, or at least MMT patients in other mountainous areas. Moreover, the self-reported approach was used to measure previous and current drug use, which might lead to recall bias if patients have a hard time remembering details of their substance use patterns. Several solutions were used to address this issue, such as not collecting patients' identity, assuring their confidentiality and recalling them to the events that associated with their latest drug use. Moreover, although we collected the methadone dosage, we could not include these data in the analysis because of low quality. Despite these limitations, our study sheds important light on factors associated with concurrent drug use among MMT patients in a mountainous area in northern Vietnam.

CONCLUSION

The findings highlighted in this study reveal the dramatic impact that MMT programmes can have on reducing illicit substance use among previously drug-addicted patients in Vietnam. Despite several existing limitations, this study highlights that MMT programmes should continue to be rolled out across Vietnam to reduce drug use, with a concurrent increase in the mental health services offered to these patients. Moreover, further studies should be warranted in a larger scale to fill the gaps in this study and to be sufficiently representative to apply across the nation.

Author affiliations

¹Institute for Preventive Medicine and Public Health, Hanoi Medical University, Hanoi, Vietnam

²Bloomberg School of Public Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA

³Berkeley School of Public Health, University of California, Berkeley, California, USA

⁴Institute for Global Health Innovations, Duy Tan University, Da Nang, Vietnam

⁵School of Medicine and Pharmacy, Vietnam National University, Hanoi, Vietnam

⁶Authority of HIV/AIDS Control, Ministry of Health, Hanoi, Vietnam

⁷Department of Hepatobiliary Surgery, Vietnam-Germany Hospital, Hanoi, Vietnam

⁸Provincial AIDS Center, Department of Health, Tuyen Quang, Vietnam

⁹Center for Research and Training, Tam Anh Hospital, Hanoi, Vietnam

¹⁰Biomedical Global Institute of Healthcare Research & Technology (BIGHEART), National University of Singapore, Singapore

¹¹Department of Psychological Medicine, Yong Loo Lin School of Medicine, National University of Singapore, Singapore

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Patient consent Obtained.

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Data sharing statement The data that support the findings of this study were made available by the Vietnam Authority of HIV/AIDS Control, but there were a few restrictions on the availability of these data. The data were used under licence for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission from the Vietnam Authority of HIV/AIDS Control.

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