FACTORS ASSOCIATED WITH ILLICIT INJECTION DRUG USE AMONG METHADONE MAINTENANCE TREATMENT PATIENTS IN INDONESIA

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Abstract. Despite methadone maintenance treatment (MMT), many continue injecting illicit drugs. In this study, we aimed to explore factors associated with continuing to use illicit injection drugs while receiving MMT in Indonesia in order to improve an illicit injection drug use harm reduction program for this marginalized population. We conducted this cross-sectional study among 342 randomly selected patients attending any of 11 MMT clinics in Indonesia, based on minimum sample size calculation and anticipated non-participation rate. Each subject was interviewed following a structured questionnaire and her/his MMT clinic records were also reviewed. Data were analyzed using multivariable logistic regression. A total of 266 MMT clinic patients participated in the study; 95.5% male. The median age of study subjects was 30 years; 38.3% of subjects (*n*=102) had a university education level; 87.2% (*n*=232) were employed, 49.6% (*n*=132) were married. Thirty-six point one percent of subjects (*n*=96) had injected illicit drugs during the previous month. On multivariable logistic regression analysis, factors significantly associated with injecting illicit drugs during the previous month were the subject perceived they had a more severe level of drug dependence [Adjusted odds ratio (Adjusted OR)] = 13.8; 95% confidence interval (95% CI: 6.6-29.0), subjects felt they did not have the ability to stop injecting illicit drugs (Adjusted OR = 5.4; 95%CI: 2.4-12.1) and the subjects felt they were in a high risk environment (Adjusted OR = 2.3; 95%CI: 1.2-4.5). Our study of MMT patients who inject illicit drugs during MMT shows this is a common problem in the study population, worse in those who believe their problem is more severe, they feel unable to stop or continue to be in a high risk environment. In order to improve MMT program efficiency, these problems need to be targeted and effective interventions created to improve them and then further studies need to be conducted to determine the efficacy of these interventions.

Keywords: injecting drug use (IDU), methadone maintenance treatment (MMT), drug dependence, self-efficacy, risk environment, Indonesia

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INTRODUCTION

Injecting illicit drugs is an important public health problem. Approximately 5.6% of world's population aged 15-64 years (about 275 million people) used drugs (any substances controlled under the international drug control conventions) at least once during 2016 (UNODC, 2018). Thirty-one million people who use drugs were estimated to have a drug use disorder (UNODC, 2018). Their drug use is regarded to be harmful to the point where they may experience drug dependence and/or require treatment. Opioids are responsible for the most of the negative health impact of drug use and have been implicated in the cause of 76% of deaths due to drug abuse/misuse (UNODC, 2018). An estimated half of people who inject drugs (PWID) (5.3 million) worldwide have chronic hepatitis C infection and about one-eight have human immunodeficiency virus (HIV) infection (UNODC, 2018); these account for >60% of HIV infections in developing countries (UNAIDS and WHO, 2009). In Indonesia, 36.4% of PWIDs have HIV infection (MOH RI and WHO Country Office for Indonesia, 2011).

Globally, 79 countries have implemented needle and syringe programs and opioid substitution therapy (UNODC, 2018). However, only 4 countries have good coverage of the at-risk population with these needle and syringe programs (UNODC, 2018). The Indonesian government adopted a national policy for injection drug use harm reduction (HR) in January 2007. The Indonesian government specified a methadone maintenance treatment (MMT) program as a high priority program in 2018 (MOH RI, 2018). The number of MMT clinics in Indonesia at the time of writing this paper was 92 sites (MOH RI, 2018). However, problems and challenges on running MMT program still remain, such as program underutilization and effectiveness (MOH RI *et al*, 2008; WHO SEARO and MOH RI, 2007). There are few studies of the incidences and prevalence of continuing to use illicit injection drugs while receiving MMT in developing countries in Southeast Asia (Hoang *et al*, 2018; Tran *et al*, 2018; Tran *et al*, 2016; Truan *et al*, 2012), unlike developed countries (Bobrova *et al*, 2006; Darke *et al*, 2007; Darke *et al*, 2005; Lev-Wiesel and Shuval, 2006; Li *et al*, 2012; Mark *et al*, 2006; Marlatt and Witkiewitz, 2005; Senbanjo *et al*, 2009; Teesson *et al*, 2006; Wong *et al*, 2010; Zaller *et al*, 2009).

In this study, we aimed to explore factors associated with continuing to use illicit injection drugs among patients receiving MMT in Indonesia in order to inform efforts to improve on illicit drug use harm reduction program for this marginalized population and improve the efficacy of the MMT program.

MATERIALS AND METHODS

Study site

This cross-sectional study was conducted in 2010 at MMT clinics in six provinces of Indonesia: North Sumatera, Jakarta, West Java, Bali, West Kalimantan, and South Sulawesi. Eleven of 30 MMT clinics in the study provinces were selected for the study due to variations in clinic types, service operation ages and locations. We excluded prison-based MMT clinics due to their homogenous structure and restricted nature. A total number of 342 subjects were determined to be needed based on an assumption of 63% of MMT patients were still using illicit injection drug (Darke *et al*, 1994), a type-1

error of 5%, an anticipated precision of 6% from the true value and anticipated non-response rate of 30%.

Inclusion criteria for study subjects were having registered with a MMT for at least 2 months and receiving treatment at the clinic during the previous month. Exclusion criteria for study subjects were being referred from another MMT clinic, having severe medical conditions, voluntarily withdrawing from drugs or not wanting to participate in the study.

The outcome variable for this study was self-reported injection of an illicit drug during the month prior to the survey. We evaluated 12 variables to determine association with injection of illicit drugs during the previous month: self-perceived severity of injecting drug dependence, self-perceived risk for contracting HIV infection, self-perceived level of self-efficacy to quit injecting illicit drug, presence of family and peer support, self-perceived high risk environment for continuing to inject illicit drugs, perceived benefits of MMT, attitudes about MMT, length of participation in the MMT, adherence to MMT, methadone dose received and addiction consultation.

Self-perceived severity of injecting drug dependence was referred to patient's subjective evaluation on the medical and psychological severity of his/her dependence on injecting drug within the last month and was measured by items, modified from The Severity of Drug Dependence/SDS (Gossop *et al*, 1995). Self-perceived risk for contracting HIV infection was defined as patient's perception on vulnerability contracting HIV infection attributable to his/her drug use behaviors and to transmit HIV infection to others. Self-perceived level of self-efficacy to quit injecting illicit drug was referred to the level of patient's self-confidence regarding his/her ability to avoid drug injecting and to take up MMT as prescribed. Presence of family and peer supports was referred to patient's cognitive appraisal of being reliably connected to family member and his/her peer IDUs, in supporting the use of MMT. Self-perceived high risk environment for continuing to inject illicit drugs was defined as patient's social contexts and influences that can drive illicit drug injection. Perceived benefits of MMT were referred to patient's perceptions of the medical and psychosocial benefits for utilizing MMT according to his/her own experiences. Attitudes about MMT was defined the patient's overall favorability about MMT. Those concepts were operationalized through questionnaire items derived from literatures, contextualized and developed in conformity with preliminary interviews with MMT patients in a pilot study.

Adherence to MMT was measured by dividing total number of days a patient received daily methadone dose with his/her cumulative enrolled days in the MMT program. Methadone dose received was referred to patient's average daily dose of methadone received within the last month. Addiction consultation was referred to frequency of drug addiction consultation sessions attended by patient. All of the data were taken from patient's corresponding medical record.

Face-to-face interview was conducted in each subject following a structured questionnaire and his/her medical record at the MMT clinic was reviewed. The questionnaire was examined for content validity by three Indonesian experts in addiction psychiatry and pre-tested on 59 MMT patients. The reliability test results for self-perceived severity of injecting illicit drug dependence, self-perceived

level of self-efficacy to quit injecting illicit drugs, presences of family support and peer support, self-perceived high risk environment for continuing to inject illicit drugs, perceived benefits of MMT, and attitudes about MMT were 0.794, 0.887, 0.780, 0.744, 0.732, 0.788 and 0.732, respectively.

We obtained written informed consent from all subjects prior to their participation in the study. The Institutional Review Board for the National Agency of Health Research and Development approved this study (No. LB.03.02/KE/9014/2009, 16 November 2009).

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 18.0 (IBM, Armonk, NY). The subjects' perception responses were scored and dichotomized at corresponding median summated scores. We compared socio-economic and demographic data using chi-squared and Fischer's exact tests. Factors potentially associated with recent illicit drug injection were assessed using bivariate and multivariate analyses. We determined odds ratios (OR) with 95% confidence intervals (CI) using logistic regression. Factors with a significant level of $p<0.20$ bivariate analysis were included in multivariate modeling using the backward likelihood method. None of the variables were excluded from multivariate analysis since their tolerance values were <0.1 and their variance inflation factor (VIF) were below 10. We also calculated the R^2 for the multivariate model (Hosmer and Lemeshow, 2000).

RESULTS

Of the 342 MMT needed as per sample size calculation, 266 actually participated (Fig 1). Two hundred and fifty-four (95.5%) of subjects were male. The mean age of study subjects was 30.3 (range: 18-50) years. One hundred and thirty-two (49.6%) of subjects were married. Two hundred and thirty (86.4%) of the subjects had at least a high school level education. The median monthly income of study subjects was IDR 1.4 million (USD 140). The study subject reported occupations were motorcycle taxi driver, parking clerk, karaoke waitress, security guard, debt collector, and non-government organization workers.

Sixty-one point three percent of subjects (n=163) started using illicit injecting opioids when aged <20 years. Prior to beginning the MMT, 40% of subjects had attended either a drug detoxification or rehabilitation program and 36.3% of subjects had previously attended a buprenorphine maintenance treatment (BMT) program. Seventy-three point one percent of subjects had previously shared needles.

Two hundred and twenty-one study subjects (83.1%) admitted to injecting illicit drugs while undergoing MMT; of whom 47.0% (n=125) had done it for more than one month prior to the interview and 36.1% (n=96) had done it during the month prior to the interview. Sixty-three point five percent of subjects who used illicit drugs during MMT said they did it because they had a craving; 64.6% of subjects injected drugs 1-4 times per month during MMT; and 93.8% of subjects (n=90) had injected heroin. Ten percent of subjects admitted to sharing a needle or other injecting paraphernalia during their last injection. Two hundred thirty-three subjects (87.6%) had ever had HIV voluntary counseling and testing (VCT). Forty-five percent of those who had previously been tested for HIV stated they were HIV positive; 51.2% of whom (n=62) were taking antiretroviral therapy (ART).

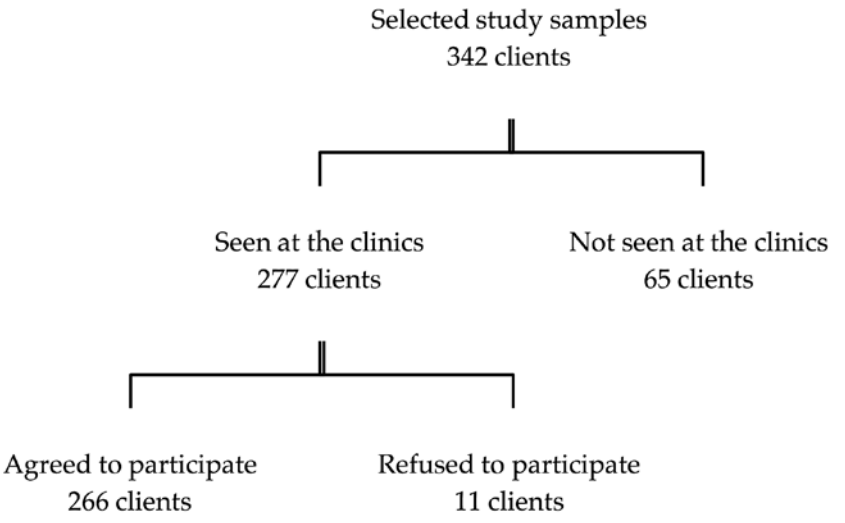

Fig 1-Sample of the study.

In our study, there were no significant differences in socioeconomic or demographic factors between those who did and did not inject illicit drugs during MMT (Table 1).

The percentage of those with and without HIV infection who injected illicit drugs (28.3% and 36.6%, respectively) were not significantly different. The percentage of those with HIV infections who were and were not taking ART who injected illicit drugs (50.0% and 40.7%, respectively) were not significantly different from each other.

On bivariate analysis, factors significantly associated with injecting illicit drugs were: having the self-perception their addiction was more severe (p<0.001), having a self-perception they had a lower self-efficacy for quitting (p<0.001), being in a higher risk environment for continuing to inject illicit drugs (p<0.001), believing MMT would not be beneficial (p=0.001), not having a favorable attitude about MMT (p=0.029), and length of participation in MMT (p=0.031). On multivariate analysis (Table 2), factors significantly associated with injecting illicit drugs during the previous month were: self-perceived of drug dependence (Adjusted OR = 13.8, 95%CI: 6.6-29.0), having a lower self-perception they had self-efficacy in quitting (Adjusted OR = 5.4, 95%CI: 2.4-12.1) and being in a higher risk environment for continuing to inject illicit drugs (Adjusted OR = 2.3, 95%CI: 1.2-4.5). The model was able to correctly classify 82.4% of MMT clients who had not injected illicit drugs during the previous month and 79.2% of those who injected illicit drugs during the previous month.

DISCUSSION

In our study, factors significantly associated with continuing to inject illicit drugs during MMT were self-perceived severity of drug dependence, self-perceived poor self-efficacy for quitting injecting illicit drugs and continuing to be in a high risk environment for continuing

Table 1
Socio-demographic characteristics of the study samples (n = 266).

Characteristics	All *n* (%)	Never injecting *n* (%)	Ever injecting *n* (%)	*p*-value
Gender				1.000
Female	12 (4.5)	8 (4.7)	4 (4.2)	
Male	254 (95.5)	162 (95.3)	92 (95.8)	
Age: years				0.343
Mean (SD)	30.3 (5.2)	30.4 (5.1)	30.1 (5.5)	
Median (IQR)	30 (5.0)	30 (5.0)	29 (8.0)	
Min; max	18; 50	18; 50	18; 45	
Highest education level				0.078
Junior high school or below	36 (13.5)	18 (10.6)	18 (18.8)	
Senior high school	128 (48.1)	80 (47.1)	48 (50.0)	
College or university	102 (38.3)	72 (42.4)	30 (31.2)	
Occupation				0.154
Employed	232 (87.2)	152 (89.4)	80 (83.5)	
Unemployed	34 (12.8)	18 (10.6)	16 (16.7)	
Estimated monthly income: millions IDR; *n*=231				0.261
Mean (SD)	2.5 (4.39)	2.65 (5.01)	2.2 (2.84)	
Median (IQR)	1.4 (16.00)	1.5 (1.84)	1.2 (1.10)	
Min; max	0.3; 50	0.3; 50	0.3; 20	
Marital status				0.090
Married	132 (49.6)	91 (53.5)	41 (42.7)	
Not yet married, divorced, separated or widowed	134 (50.4)	79 (46.5)	55 (57.3)	
Self-reported HIV serostatus				0.531
Negative	145 (54.5)	93 (54.7)	52 (54.2)	
Positive	121 (45.5)	77 (45.3)	44 (45.8)	
Type of MMT clinic attended: *n* (%)				0.320
Hospital-based	114 (42.9)	69 (40.6)	45 (46.9)	
Puskesmas-based[a]	152 (57.1)	101 (59.4)	51 (53.1)	

Note: SD=standard deviation; IQR=interquartile range; IDR=Indonesian Rupiah; HIV=Human Immunodeficiency Virus; MMT=methadone maintenance treatment
[a] Puskesmas is a primary health care unit run by the government.

to inject illicit drugs. Our findings are similar to studies in Ukraine (Makarenko *et al*, 2018) and Chinese (Wu *et al*, 2012) that found more severe addiction and psychological dependence correlated with concurrent drug injection.

In our study, a low level of self-efficacy was significantly associated with injecting illegal drugs during the previous month. A sense of self-efficacy is improved by avoiding the undesired behavior or reducing the frequency

Table 2
Bivariate and multivariate analysis of factors associated with injecting illicit drugs among study subjects (n = 266).

Factors	Unadjusted		Adjusted[a]	
	OR (95%CI)	p-value	OR (95%CI)	p-value
Age (years)	0.99 (0.94-1.04)	0.667	1.01 (0.95-1.08)	0.658
Gender: male	1.14 (0.33-3.88)	0.839	0.80 (0.17-3.81)	0.776
Perceived severity of drug dependence: higher	18.32 (9.17-36.60)	<0.001	13.83 (6.59-29.01)	<0.001
Perceived self-efficacy: lower	9.45 (4.60-19.43)	<0.001	5.35 (2.37-12.08)	<0.001
Risk environment: higher	3.06 (1.81-5.16)	<0.001	2.31 (1.19-4.49)	0.013
Perceived risk of HIV transmission: lower	2.15 (0.70-6.59)	0.181		
Perceived benefits of MMT: lower	2.52 (1.46-4.36)	0.001		
Attitudes toward MMT: less favorable	1.78 (1.06-2.99)	0.029		
Length of participation in MMT, days	1.00 (1.00-1.00)	0.031		

Notes: [a] adjusted for age and gender; OR=odds ratio; CI=confidence interval

of expressing the undesired behavior (Dimeff and Marlatt, 1998), especially and in a high risk situation (Bandura, 1977), reducing the chance of relapse (Dimeff and Marlatt, 1998). A previous study also found perception of low self-efficacy was associated with continued heroin use among MMT patients (Senbanjo *et al*, 2009). Another study found a low level of self-efficacy was associated with a greater chance of becoming discouraged by failure to resist heroin in high-risk situations (Brewer *et al*, 1998). Lacking an effective coping response in a high-risk situation may result in a failure with a resultant decrease in self-efficacy (Dimeff and Marlatt, 1998).

Previous studies have reported continuing to use illicit drugs during MMT was associated with psychological process (cravings, urges), negative emotional states (stress, insomnia, conflict with others); positive emotional states (pleasant times, celebrations), and temptation situations (drug availability, spending time with drug users, social pressure to use, testing self-control) (Brewer *et al*, 1998; Niaura, 2000). In our study, 28.9% of subjects stated peers offered them drugs, putting them at high risk.

In our study, treatment variables not associated with injecting illicit drugs during MMT were perceived MMT benefits, attitudes about MMT, length of MMT participation, MMT adherence, current methadone dose, and frequency of addiction consultations. These suggest treatment factors alone are insufficient to affect subject behavior. This suggests, other interventions need to be created, tested and implemented to improve MMT success rates.

Our results suggest, MMT patients need to be taught to identify and cope with or avoid high-risk situations. MMT providers need to assess the patient's self-efficacy level, teach coping mechanisms for high-risk situations and how to deal with relapses (Marlatt *et al*, 2009).

Our study had several limitations. These included the cross-sectional design, which does not allow examination of causation. We employed a one-level study design rather than a multilevel design as suggested by others (Broome *et al*, 1999; Heinrich and Lynn, 2002; Hser *et al*, 1999). However, in the Indonesian context, a multilevel study design is difficult due to lack of a large population (Maas and Hox, 2005). It is possible some of our subjects answer questions dishonestly. However, a previous study found drug users are sufficiently reliable to provide a history of drug use, drug-related problems, criminality and HIV risk behaviors (Darke, 1998). Another study found a high correlation between self-reports of syringe sharing and DNA analysis of the contents of used syringes and between self-report HIV status and HIV antibody test results (Menoyo *et al*, 1998).

We conclude that patients injecting illicit drugs during MMT is a common problem in the study population; worse in those who believe their problem is more severe, feel unable to stop or continue to be in a high-risk environment. In order to improve MMT program efficiency, these problems need to be targeted and effective interventions be created to solve those problems. Further studies should be conducted to determine the efficacy of these interventions.

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