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Club drugs and Alcohol Abuse Predicted Drop-out and Poor Adherence among Methadone Maintenance Treatment Patients in Guangzhou, China

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Abstract

Club drugs and alcohol abuse are prevalent among methadone maintenance treatment (MMT) patients. However, little is known about the association between these abuse and treatment outcomes among MMT patients. The aim of this study is to examine the prevalence of club drugs and alcohol abuse among MMT patients and to investigate the associations between these abuse and treatment outcomes – drop-out and poor adherence. In this one-year cohort study conducted in Guangzhou, China, data including background characteristics, club drugs use in the last six months, alcohol use history and treatment-related information was collected. Cox regression analyses and log-binomial regression analyses were applied to identify the associations between these abuse and drop-out and poor adherence respectively. Thirty-seven participants (9.2%) admitted to the use of at least one type of club drugs in the last six months and eighty-eight (21.9%) were identified as alcohol abusers. Of all participants, 21.0% had dropped out of treatment and 27.7% exhibited poor adherence during the study period. Adjusting for significant background variables, use of at least one type of club drugs [hazard ratio (HR) = 1.90, 95% confidence interval (CI) = 1.01–3.56] and use of methamphetamine in the last six months (HR = 2.26, 95% CI = 1.15–4.43) significantly predicted drop-out. Frequency of having six or more drinks on one drinking occasion when drinking [risk ratio (RR) = 1.87, 95% CI = 1.16–2.95] significantly predicted poor adherence. Our findings indicated that club drugs and alcohol abuse predicted drop-out and poor adherence among MMT patients. Early identification and intervention for the abuse should be taken into consideration when developing interventions tailored to improve treatment outcomes among MMT patients.

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Disclosure statement

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Keywords

Methadone maintenance treatment; drop-out; adherence; club drugs; alcohol

Introduction

Methadone maintenance treatment (MMT) is a substitution therapy for opioid addiction and has developed rapidly worldwide (Joseph, Stancliff & Langrod, 2000). Since 2004, China formally started MMT as a treatment programme and this initiative effectively curbed the spread of the HIV epidemic among drug users (Pang et al., 2007). In MMT, medication adherence is necessary to ensure the full effects (Jaremko, Sterling & Van Bockstaele, 2015). However, the requirement for long-term or even life-long daily attendance has led to poor adherence and high drop-out rates among MMT patients (Mattick, Breen, Kimber, & Davoli, 2014).

Studies consistently indicate that socio-demographic characteristics (e.g., age, sex and income), treatment-related characteristics (e.g., methadone dosage) and continued heroin use during treatment are associated with MMT drop-out and poor adherence (Cao et al., 2014; Proctor et al., 2015; White et al., 2014; Zhang et al., 2013). Drug users' additive behaviours cluster with each other. Studies showed that multiple substance use, especially club drugs (e.g., methamphetamine and ketamine) and alcohol abuse, is popular among heroin users in recently years (Alam-mehrjerdi & Abdollahi, 2015; Dobler-Mikola et al., 2005; Wang et al., 2015). However, very few studies investigated the association between club drugs and alcohol abuse and treatment outcomes among MMT patients.

To fill this gap, this prospective cohort study aimed to investigate the prevalence of club drugs abuse and alcohol abuse among MMT patients in Guangzhou, and to assess how they predict drop-out and poor adherence among the patients during the one-year follow up period. We hypothesized that a significant proportion of MMT patients were using club drugs or alcohol; MMT patients exhibiting club drugs abuse or alcohol abuse would be more likely to drop out from MMT programme or to have poor treatment adherence.

Methods

Study participants

Participants of this prospective cohort study were recruited in August 2013 in four of the nine MMT clinics in Guangzhou city, and were followed up for a year. Eligible participants should be aged at least 18 years old, active heroin users prior to treatment, registered Guangzhou residents and could provide informed consents. Participants who intended to leave Guangzhou in the coming year were excluded. A total of 438 participants were approached, among whom 406 agreed to participate in the study and 401 finished the interview.

Measurements and outcomes

After informed consent, face-to-face interviews using structured questionnaires were conducted by trained interviewers. Data on socio-demographic characteristics, history of drug abuse and treatment-related characteristics were collected (Table 1). One statement was used to assess the abuse of club drugs: “Have you used any of the club drugs listed below in the last six months?” The studied club drugs included methamphetamine, ketamine, ecstasy, MaGu (methamphetamine and caffeine as main components), and triazolam, which are commonly used in China according to our literature review (Ding, He & Detels, 2013; Yang & Xia, 2010). A three-item Chinese version of the Alcohol Use Disorder Identification Test-Consumption (Ch-AUDIT-C) scale was used to measure alcohol abuse of MMT patients (Yip et al., 2015). Participants with a score ≥ 4 (male) or ≥ 3 (female) were identified as alcohol abusers (Delaney et al., 2014).

Participants’ daily treatment records since recruitment to August 31, 2014 were extracted from the MMT treatment information system. Drop-out was defined as not having visited the clinic for at least thirty consecutive days prior to the study’s completion date. We also used the outcome of poor adherence, which was defined as either being a drop-out case or having attended the MMT clinic for less than 50% of the follow-up period to cover intermittent MMT use cases.

Statistical analyses

Univariate Cox regression models were fitted to identify background variables that were associated with drop-out; variables with $P < 0.1$ were used as candidates of a forward stepwise multivariate Cox regression model. Significant variables with $P < 0.05$ were identified as potential confounders and were adjusted in another set of Cox regression models, using club drugs and alcohol abuse as independent variables respectively to predict drop-out. Similar approaches were applied using log-binomial regression models to predict poor adherence. Hazard Ratio (HR) and Relative risk (RR) with their 95% confidence intervals (CIs) were estimated. All P -values were two-sided. All statistical analyses were performed using the SAS software version 9.2 (SAS, Cary, NC).

Results

Background characteristics of study participants

Profiles of all participants are shown on Table 1. Thirty-seven participants (9.2%) admitted to the use of at least one type of club drugs in the last six months. The use rates of methamphetamine, MaGu, ketamine, triazolam and ecstasy in the last six months were 31 (7.7%), 8 (2.0%), 5 (1.2%), 4 (1.0%) and 4 (1.0%) respectively. Approximately half (47.6%) had ever consumed alcohol. Overall, eighty-eight (21.9%) participants exhibited alcohol abuse (male 22.2%, female 20.0%).

Incidence of drop-out and predictors

Eighty-four [21.0%; 95% CI: (17.1%, 25.3%)] participants dropped out from MMT during the study period. The estimated probabilities of dropping out were presented in Fig. 1. In multivariate Cox regression model, current marital status (divorced or other versus single:

HR = 2.10, 95%CI = 1.13–3.89; $P = 0.019$; data not tabulated) and times of compulsory drug detoxification (three times or more versus never: HR = 0.36, 95%CI = 0.16–0.83; $P = 0.017$) were significant background predictors of drop-out. After adjusting for the two significant covariates, use of at least one type of club drugs in the last six months (yes versus no: HR = 1.90, 95%CI = 1.01–3.56; $P = 0.047$) and use of methamphetamine in the last six months (yes versus no: HR = 2.26, 95%CI = 1.15–4.43; $P = 0.017$) significantly predicted drop-out (Table 2).

Incidence of poor adherence and predictors

One hundred and eleven [27.7%; 95%CI: (23.4%, 32.3%)] participants exhibited poor adherence. In multivariate log-binomial regression model, being transferred from other clinics (yes versus no: RR = 1.96, 95%CI = 0.99–3.86; $P = 0.049$) was significantly associated with poor adherence. In Table 3, after adjusting for being transferred from other clinics, frequency of having six or more drinks on one drinking occasion significantly predicted poor adherence (at least once versus never: RR = 1.87, 95%CI = 1.16–2.95; $P = 0.018$).

Discussion

This is one of the first studies using club drugs and alcohol abuse to predict drop-out and poor adherence among MMT patients. The findings (drop-out rate 21% and poor adherence rate 27.7%) were lower than those of other studies in China (drop-out rates ranging from 43% to 51.3%; poor adherence about 60%) (CHE et al., 2010; Gu et al., 2012; Lin, Hung, Peng, Chao, & Lee, 2015). It is possible as our study used a relatively broad definition of drop-out (30 days no MMT use) as compared to other studies (7 or 14 days no MMT use). Furthermore, our participants were current instead of newly recruited MMT users as in most other studies. Drop-out rates are known to be higher among patients in their first months of treatment (Strike et al., 2005).

In our study, patients who had used methamphetamine or any kind of club drugs in the last six months were 2.26 or 1.90 times more likely than others to drop out from MMT; patients who had six or more drinks during one drinking occasion for at least once were 1.87 times more likely than others to exhibit poor adherence. Drug users are in a context of syndemic of multiple risk behaviours (e.g., multiple substances use), psycho-social problems (e.g., depression, lacking of social support, social isolation) and diseases (e.g., HIV and HCV infection), which may lead to their poor coping ability and poor treatment compliance (González-Guarda, Florom-Smith & Thomas, 2011; Mizuno et al., 2015). The emergence of club drugs and alcohol abuse among MMT patients hence brings new challenges to current MMT programmes and highlights the needs for interventions (Shariatirad, Maarefvand & Ekhtiari, 2013).

In China, MMT clinics could service as a platform to reach drug users in community and provide holistic interventions incorporating multiple co-occurring conditions among MMT patients (Loeliger, 2016). MMT clinics could not only strengthen educational initiatives on the harm of club drugs and alcohol abuse, provide regular screening tests of club drugs and alcohol abuse, but also evaluate regularly patients' physical and psycho-social status, and

provide referral services (e.g., psychological treatment, AIDS treatment). Though there is a lack of manpower in medical staff to provide high quality comprehensive services in MMT clinics in China, there are also successful service models which incorporated methadone treatment with psycho-social services provided by social workers in MMT clinics (Gu et al., 2013; Lin et al., 2010).

There were several limitations of this study. Firstly, unidentified confounders might exist and confound the study's conclusions. Secondly, the self-reported nature of club drugs use may result in bias due to the sensitivity of this topic. Thirdly, most of our participants have been on MMT for more than one year. Findings might not be applicable to newly-admitted MMT patients. Fourthly, the small sample size might result in potential sampling biases and limit the power to detect the predictive ability of some variables. Therefore, we should be careful about the generalizability of the findings. Lastly, our study involved only one city, limiting the generalizability of its findings.

In summary, our study has shown that club drugs and alcohol abuse are important problems in MMT clinics and may result in high drop-out rate and poor adherence without effective interventions. As MMT is the primary harm reduction programme controlling drugs abuse in China, holistic interventions to reduce club drugs and alcohol use among MMT patients are needed urgently. Further studies are required to evaluate evidence-based interventions that can improve treatment outcomes.

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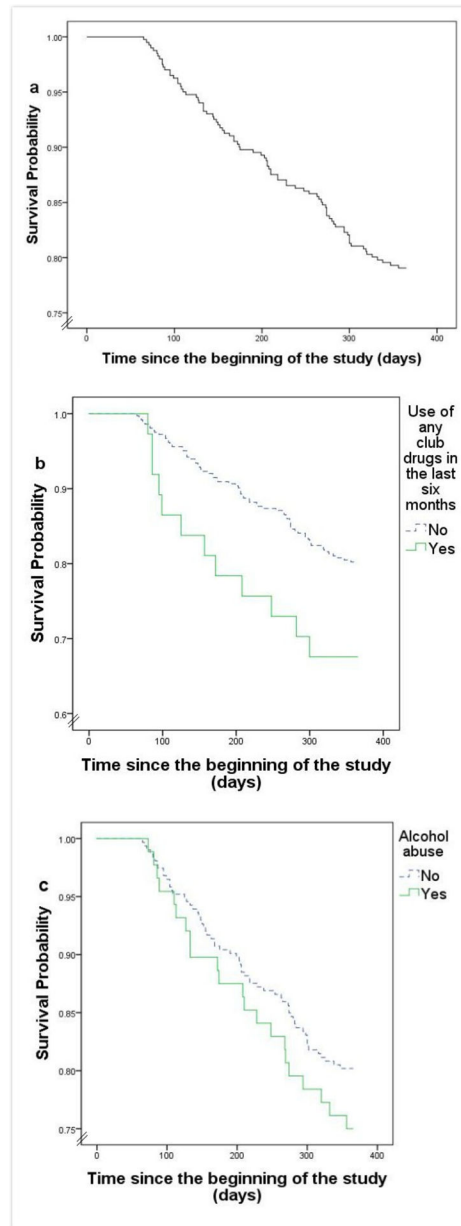


Figure 1.

a The survival curve of all study participants.

b The survival curve of study participants grouped by club drugs abuse status.

c The survival curve of study participants grouped by alcohol abuse status.

Table 1.

Background characteristics of all participants (n=401)

	n	%
<i>Socio-demographic characteristics</i>		
Sex		
Male	351	87.5
Female	50	12.5
Age group		
<40	117	29.2
40	284	70.8
Education level attained		
Primary or below	98	24.4
Junior high	221	55.1
Senior high or above	82	20.5
Current marital status		
Single	138	33.2
Married or cohabitation	215	53.6
Divorced or other	53	13.2
Current employment status		
No	225	56.1
Yes (full-time or part-time)	176	43.9
HIV infection status		
No	387	96.5
Yes	14	3.5
<i>Drug use history</i>		
Age of first drug use (years)		
<20	85	21.2
20	316	78.8
Ever injected drugs		
No	75	18.7
Yes	326	81.3
Number of times of compulsory drug detoxification		
0	61	15.2
1–2	223	55.6
3	117	29.2
<i>Treatment-related characteristics</i>		
Duration of MMT(year)		
0	65	16.2
1–2	183	45.6
3	153	38.2
Being transferred from other MMT clinics		
No	362	90.3

	n	%
Yes	39	9.7
Ever re-admitted to MMT		
No	355	88.5
Yes	46	11.5
Average daily dose of methadone during the survey (mg/day)		
<60	203	50.6
60	198	49.4

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Table 2.Using club drugs and alcohol abuse to predict drop-out (Cox regression analyses, $n=401$)

	Row %	Univariate HR(95%CI)	P-value	Adjusted for significant background variables ^a HR(95%CI)	P-value
<i>Club drug abuse</i>					
Use of any of the club drugs in the last six months					
No	19.8	1.00		1.00	
Yes	32.4	1.86 (1.01, 3.42)	0.047	1.90 (1.01, 3.56)	0.047
Use of methamphetamine in the last six months					
No	19.7	1.00		1.00	
Yes	35.5	2.13 (1.13, 4.02)	0.019	2.26 (1.15, 4.43)	0.017
Use of Ma Gu in the last six months					
No	20.6	1.00		1.00	
Yes	37.5	2.11 (0.67, 6.68)	0.204	1.79 (0.55, 5.80)	0.334
Use of Triazolam Tablets in the last six months					
No	20.9	1.00		1.00	
Yes	25.0	1.26 (0.18, 9.06)	0.817	1.51 (0.21, 10.97)	0.684
Use of ketamine in the last six months					
No	21.0	1.00		1.00	
Yes	20.0	0.97 (0.14, 6.98)	0.977	0.91 (0.12, 6.78)	0.926
Use of ecstasy in the last six months					
No	20.9	1.00		1.00	
Yes	25.0	1.26 (0.18, 9.06)	0.817	1.63 (0.22, 12.23)	0.635
<i>Alcohol abuse</i>					
Overdrinking					
No	19.8	1.00		1.00	
Yes	25.0	1.30 (0.80, 2.12)	0.290	1.17 (0.72, 1.92)	0.519
Drinking frequency					
Never	21.9	1.00		1.00	
At least once	19.9	0.89 (0.58, 1.37)	0.603	0.84 (0.54, 1.29)	0.421
Drinks on a typical day when drinking					
1–2 drinks	17.3	1.00		1.00	
3 drinks	24.2	1.50 (0.78, 2.88)	0.229	1.38 (0.71, 2.69)	0.335
Frequency of having 6 or more drinks on 1 occasion when drinking					
Never	16.2	1.00		1.00	
At least once	27.8	1.85 (0.96, 3.56)	0.067	1.94 (1.00, 3.78)	0.051

^aCox regression models adjusting for potential confounders (current marital status and number of times of compulsory drug detoxification), which predicted drop-out significantly at end of the study in a multivariate model (stepwise). HR: hazards ratio; CI: confidence interval.

Table 3.Using club drugs and alcohol abuse to predict poor adherence (log-binomial analyses, $n=401$)

	Row %	Univariate PR(95%CI)	P-value	Adjusted for significant background variable ^b RR(95% CI)	P-value
<i>Club drug abuse</i>					
Use of any of the club drugs in the last six months					
No	27.2	1.00		1.00	
Yes	32.4	1.19 (0.68, 1.85)	0.485	1.19 (0.68, 1.83)	0.490
Use of methamphetamine in the last six months					
No	27.0	1.00		1.00	
Yes	35.5	1.31 (0.74, 2.04)	0.289	1.33 (0.75, 2.06)	0.256
Use of Ma Gu in the last six months					
No	27.5	1.00		1.00	
Yes	37.5	1.36 (0.40, 2.66)	0.503	1.26 (0.37, 2.43)	0.614
Use of Triazolam Tablets in the last six months					
No	27.7	1.00		1.00	
Yes	25.0	0.90 (0.06, 2.66)	0.906	0.95 (0.06, 2.82)	0.955
Use of ketamine in the last six months					
No	27.8	1.00		1.00	
Yes	20.0	0.72 (0.05, 2.30)	0.715	0.57 (0.04, 1.87)	0.538
Use of ecstasy in the last six months					
No	27.7	1.00		1.00	
Yes	25.0	0.90 (0.06, 2.66)	0.906	0.78 (0.05, 2.29)	0.778
<i>Alcohol abuse</i>					
Overdrinking					
No	25.9	1.00		1.00	
Yes	34.1	1.32 (0.91, 1.83)	0.118	1.34 (0.93, 1.86)	0.092
Drinking frequency					
Never	28.6	1.00		1.00	
At least once	26.7	0.93 (0.68, 1.28)	0.676	0.95 (0.69, 1.31)	0.764
Drinks on a typical day when drinking					
1–2 drinks	23.6	1.00		1.00	
3 drinks	32.3	1.37 (0.83, 2.19)	0.201	1.35 (0.83, 2.16)	0.214
Frequency of having 6 or more drinks on 1 occasion when drinking					
Never	21.3	1.00		1.00	
At least once	38.9	1.82 (1.13, 2.89)	0.011	1.87 (1.16, 2.95)	0.018

^bLog-binomial regression models adjusting for potential confounders (transfer treatment), which predicted poor adherence significantly at end of the study in a multivariate model (stepwise). RR: relative risk; CI: confidence interval.