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Demographic and mental history-related data predicted occurrence of psychosis in metamphetamine users

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ABSTRACT

Methamphetamine use is increasing worldwide, and the occurrence of psychosis further complicates treatment. This holds also true for Iran. The aim of the present study was to investigate possible predictors of metamphetamine-induced psychosis. 237 methamphetamine users (70.9% with psychosis; mean age: M=33.41 years) took part in the study. A psychiatric interview was performed covering socio-demographic and illness-related information. Male gender, low education, unemployment, being single, a history of mental disorders, and a higher number of previous hospitalizations predicted the occurrence of psychosis, while age and duration of metamphetamine use were excluded from the equation. Socio-demographic and mental illness-related dimension seemed suitable to predict occurrence of psychosis among metamphetamine abusers.

1. Introduction

Methamphetamine (MA; N-methyl-alpha-methylphenethylamine; a synthetically produced substance derived from phenethylamine and strongly stimulating the CNS) has become the second most prevalently used drug globally (United Nations Office on Drugs and Crime Vienna, 2013). Studies have reported a 400% increase in amphetamine (A) and MA use in Iran seized between 2010 and 2011 (Mexico: 238%; Thailand: 166%; USA: 153%; China: 140%; (United Nations Office on Drugs and Crime Vienna, 2012). It is estimated that 1.6–2.67% of the Iranian population (75.1 mio in 2011) is dependent from illicit drugs (Alam-Mehrjerdi et al., 2015). Most often, opium, opium residues, low purity heroin, cannabis, and alcohol are abused, while cocaine, inhalants, or ecstasy are not common (Alam-Mehrjerdi and Abdollahi, 2015). Importantly, after opium, A and MA are the most commonly abused substances in Iran (Zarghami, 2011), and MA-induced psychosis has become the new health challenge for the country (Alam-Mehrjerdi et al., 2013; Härtel-Petri et al., 2005).

A and MA are medications given to patients diagnosed with attention-deficit/hyperactivity disorder (ADHD) and intended to improve attention and concentration and reduce over-activity (Castells et al., 2011), while in patients diagnosed with narcolepsy A and MA regulate wakefulness and daytime sleepiness (Ng and O'Brien, 2009). However, as side effects and when abused, A and MA may lead to severe health problems including anxiety, hyperactivity, aggression, loss of appetite, tachycardia, mydriasis, hypertension, headache, sleep disturbance, palpitations, arrhythmia, paranoia, obsessive-compulsive disorders (OCD; Shakeri et al., 2016), sexual dysfunction and psychosis (Lineberry and Bostwick, 2006; Farnia et al., 2014). The clinical characteristics of metamphetamine-induced psychosis (MAIP) are usually similar to acute paranoid schizophrenia, and often presented by hallucinations and persecutory delusions (Hsieh et al., 2014; Harris and Batki, 2000). Further, a MAIP is a relatively common psychiatric disorder among amphetamine users, with incidence rates ranging from 13% to 45% per year (Grant et al., 2012; McKetin et al., 2006), and with a 13-fold higher risk of psychosis in A and MA users than in the healthy population (Sara et al., 2011).

Despite the increasing number of A/MA users and A/MA patients with A/MA abuse, research into predictors of the incidence of MAIPs remains limited. It is not well understood, if rather A/MA-related characteristics (amount over time, amount on one occasion), or user-specific characteristics, or the combination of both trigger psychosis (cf. Bramness et al., 2012). In search of possible socio-demographic predictors, Lecomte et al. (2013) assessed a Canadian sample of 295 patients with MA abuse and

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psychotic symptoms and observed that older age, more severe psychotic symptoms, misuse of MA over a long period, and depressive symptoms were the strongest predictors of MA-induced psychosis. However, comparable studies on Iranian samples have not so far been published. The aim of the present study was therefore to compare socio-demographic and illness-related dimensions of MA-abusers with and without MAIP. In doing so, our aim was to identify more precisely those MA-abusers at greater risk of developing a MAIP.

2. Methods

2.1. Study design

The present cross-sectional study, assessing inpatients with diagnosed MA abuse (see below), was carried out between March 2013 and January 2015 in Kermanshah (Iran). All participants were informed about the study aims, the voluntary basis of participation and about the confidential nature of data selection and data handling. Further, participants provided written informed consent. The study was approved by the local ethics committee and was conducted in accordance with the ethical standards laid down in the Declaration of Helsinki.

2.2. Patients

The main causes of admissions were the presence of psychotic symptoms, amphetamine induced mood disorders, suicidal/homicidal thoughts, severe aggression, or amphetamine intoxication. Further, the majority of patients had a compulsory hospitalization ordered by a psychiatrist.

Inclusion criteria were as follows: (a) current diagnosis of amphetamine use according to the structured clinical interview for psychiatric disorders (Sheehan et al., 1998), (b) a positive amphetamine urine test, (c) age between 18 and 60 years; (d) written informed consent. Subjects were excluded for the following reasons: (a) not meeting the inclusion criteria; (b) history of any primary psychotic disorder (schizophrenia, schizophreniform, schizoaffective disorder, mood disorder with psychotic features, delusional disorder, and brief psychotic disorder), mood disorder (unipolar, bipolar), or anxiety disorder; (c) in the case of female patients, (planned) pregnancy or breastfeeding.

From a total of 484 admissions, 191 (39.5%) did not meet the study criteria (see above), 25 (5.2%) did not give urine samples, and 31 (6.4%) declined participation. Finally 237 inpatients were assessed (216 (91.1%) male and 21 (8.9%) female; 168 (70.9%) with psychosis; 69 (29.1%) without psychosis; mean age: M=33.41 years, SD=9.48). The main psychotic features were: auditory hallucinations: 92 (54.8%); visual hallucinations: 12 (7.1%); persecutory delusion: 48 (28.6%); reference delusion: 11 (6.5%); grandiosity delusion: 5 (3%).

2.3. Assessments

Upon admission, trained psychiatrists performed the clinical and psychiatric interview. Diagnoses were made using the structured clinical interview for psychiatric disorders (Mini International Neuropsychiatric Interview), and psychotic symptoms were registered. The Interview for the Retrospective Assessment of the Onset and Course of Schizophrenia and Other Psychoses (IRAOS; Hafner et al., 1992; Maurer et al., 2016) was used to retrospectively reconstruct the onset period and course of psychotic disorder. Socio-demographic and historical data were gathered, including information on the current psychotic episode, such as symptoms and duration of current psychotic episode in addition to details of previous episodes including psychiatric hospital admissions, outpatient care, and family psychiatric history.

Laboratory urine samples were screened for drugs using thin-layer chromatography (Thin-Layer Chromatography TLC; Distributor CAMAC® Mahzad Kala Co. Ltd, Tehran, Iran) for benzodiazepines, barbiturates, dextropropoxyphene, opiates, methadone, cocaine, amphetamines (amphetamine, methamphetamine, khat and ecstasy) and Lycergic Acid Diethylamide (LSD).

2.4. Statistical analyses

First, a series of *t*-tests and Chi square tests were performed to compare socio-demographic and illness-related variables between patients with and without psychosis. Next, to predict MA users with MAIP, a binary logistic regression (stepwise estimation) was performed with Psychosis (yes vs. no) as the dependent variable and socio-demographic and illness-related variables as independent variables. The nominal level of significance was set at alpha =0.05. Levels of significance were reported as follows: $^{*}=p<0.05$; $^{**}=p<0.01$; $^{***}=p<0.001$. All computations were performed with SPSS® 22.0 (IBM Corporation, Armonk NY, USA) for Apple Mac®.

3. Results

3.1. Socio-demographic and illness-related dimensions: comparisons between MA users with and without psychosis

All descriptive and inferential statistical indices are reported in Table 1. Compared to MA users without MAIP, MA users with MAIP were more likely to be male, to have started drug use and MA use at a lower age, to have attained a lower educational level, to be currently unemployed, and to be single. They were more likely to report longer use of MA, the use of more concomitant drugs (along with less opium abuse), and they were more likely to report previous psychiatric hospitalizations and unsuccessful cessations. Further, there was a higher incidence of mental disorders among family members, including addiction disorders in this group.

3.2. Predicting MA users with MAIP

To predict MA users with MAIP, a binary logistic regression (stepwise estimation) was performed. Overall, the model explained 51.6% of the variance (Wald statistics (X^2(N=237, df =5)= 42.73**)). Significant predictors were male gender (beta=6.06**), low education (beta=4.93**), unemployment (beta =12.39**), being single (beta=9.98**), main addiction to more than one drug (beta =12.56*), number of previous psychiatric hospitalizations, and reported mental illness in the family (beta =9.34**), including addiction disorders (beta=14.32**). Current age, age at drug and MA use onset, duration of MA use, the number unsuccessful cessations, the number of concomitant drugs, and the duration of MA use prior to current hospitalization were excluded from the equation (all betas <0.04, ps >0.40).

4. Discussion

The key finding of the present study was that compared to metamphetamine (MA) users without methamphetamine-induced psychosis (MAIP), those with MAIP had distinctive socio-demographic and illness-related characteristics. Specifically, the prototype of an MA user with MAIP is male, single, unemployed, with low education, with the main diagnosis of more than one drug addiction, and with a background of family members with a