Research paper

Increased prevalence of self-reported psychotic illness predicted by crystal methamphetamine use: Evidence from a high-risk population

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A R T I C L E   I N F O

A B S T R A C T

Background: The potential of methamphetamine, and high-potency crystal methamphetamine in particular, to precipitate psychotic symptoms and psychotic illness is the subject of much speculation internationally. Established psychotic illness is disabling for individuals and costly to society. The aim of this study was to investigate whether use of crystal methamphetamine was associated with greater prevalence of self-reported psychotic illness, compared to use of other forms of methamphetamine.
Methods: The sample comprised participants interviewed as part of an annual cross-sectional survey of Australian people who inject drugs. Comparisons were made between groups according to the nature of their methamphetamine use: crystal methamphetamine or other forms of methamphetamine. Self-reported diagnoses of psychotic illness and other mental health problems were compared between groups. Predictors of self-reported psychotic illness were examined using multivariable logistic regression analyses.
Results: Self-reported psychotic illness was highly prevalent among users of crystal methamphetamine (12.0%), and significantly more so than among users of other forms of methamphetamine (3.9%) (OR = 3.36; CI: 1.03–10.97). Significant predictors of self-reported psychosis in the cohort were: use of crystal methamphetamine; dependent use; lack of education beyond high school; and younger age.
Conclusion: Highly increased prevalence of self-reported psychotic illness is associated with use of high-potency crystal methamphetamine in people who inject drugs, particularly where there is dependent use. There is an urgent need to develop effective interventions for dependent crystal methamphetamine use; and a need to monitor for symptoms of psychotic illness in drug-using populations.

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Introduction

Reports of escalating methamphetamine use and dependence in Australia, the United States, and more widely have generated major concerns about the public health consequences for users of the drug (Degenhardt, Larney et al., 2016). The potential of methamphetamine, and crystal methamphetamine in particular, to precipitate psychotic symptoms has been the subject of much recent speculation. Amphetamine-related harms, including hospital admissions for amphetamine psychosis (Degenhardt, Sara et al., 2016; NSW MoH, 2015), have increased in tandem with increased availability of high-potency crystal methamphetamine. This prompts the question whether methamphetamine, and specifically crystal methamphetamine, has contributed to increased rates of psychotic illness in the injecting drug using population.

Crystal methamphetamine may be particularly harmful because of its high potency compared to other forms of methamphetamine, analogous to the greater harms associated with high-potency "crack" cocaine in comparison to other forms of cocaine (Cornish & O'Brien, 1996). In addition to the higher purity of crystal methamphetamine (Cho, 1990), because it can be inhaled/smoked it reaches the brain more readily, with a more rapid onset of effects (Cho, 1990). Methamphetamine dependence is strongly associated with injecting and smoking, and with use of the high-potency form crystal methamphetamine (Darke et al., 2008).

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The association between stimulant (amphetamine/methamphetamine) use and psychosis has been described historically (Connell, 1958), and it is well-recognised that methamphetamine can induce psychotic symptoms (Hall, Hando, Darke, & Ross, 1996; Smith, Thirthalli, Abdallah, Murray, & Cottler, 2009). Prevalence of psychotic symptoms is over three times more common among dependent methamphetamine users (27%) compared to non-dependent users (8%) (McKetin, Hickey, Devlin, & Lawrence, 2010); and a dose-dependent increase in psychotic symptoms is observable during periods of heavy use (McKetin, Lubman, Baker, Dawe, & Ali, 2013). However, the extent to which methamphetamine use may give rise to established psychotic illness, rather than to transient symptoms, is less clear. Certainly for some, symptoms do not immediately resolve, giving rise to brief "drug-induced" or "methamphetamine psychosis" (Bramness et al., 2012). In a large population-based study in the U.S. it was demonstrated that, compared to matched controls, there is a significantly increased risk of schizophrenia development in methamphetamine users who were free of psychosis before drug use (Callaghan et al., 2012). Cumulative risk for a schizophrenia spectrum diagnosis was 30% at eight-year follow-up in a large cohort of individuals with amphetamine-induced psychosis (Niemi-Pynttari, Putkonen, Vorma, Wahlbeck, & Pirkola, 2013). A seven-year clinical follow-up of patients with methamphetamine psychosis found that 20% of those followed-up had a diagnosis of schizophrenia (Kittirattana-paiboon, Mahatnirunkul, Booncharoen, Dumrongchai, & Chutha, 2010); and elsewhere, in a smaller cohort of patients with amphetamine-induced psychosis, one third converted to schizophrenia over six-year follow-up (Medhus et al., 2015). None of these studies examined dependence or form of methamphetamine as risk factors for established psychotic illness, so the contribution of methamphetamine or crystal methamphetamine in particular is not yet well understood.

Aims

This study examined the question whether use of *crystal methamphetamine* was associated with increased prevalence of psychotic illness in a drug-using population, compared to use of other forms of methamphetamine. Further, predictors of self-reported psychotic illness were examined to determine whether crystal methamphetamine use predicted psychotic illness, independently of other known predictors such as male gender, age, and lower educational attainment.

A cohort of people who inject drugs (PWID) was categorised into three mutually exclusive groups on the basis of recent (past six months) use: i) no methamphetamine use; ii) other methamphetamine use (no crystal methamphetamine); and iii) crystal methamphetamine use. Rates of self-reported psychotic illness between users of crystal methamphetamine and users of other methamphetamine were compared. Additionally, the predictors of psychotic illness in this high-risk cohort of PWID were investigated.

Methods

Participants

A total of 898 people who inject drugs (PWID) were interviewed between June and October 2014, across all states and territories, as participants of Australia's annual Illicit Drug Reporting System (IDRS), an annual national monitoring system for detection of emerging trends in the illicit drug market. Methods are detailed in full elsewhere (Stafford & Burns, 2014), but briefly: a cross-sectional non-probability sample of PWID who reported at least monthly illicit drug injection in the preceding six months were recruited via needle and syringe programs, user representative

groups, street-press advertisement, and peer referral. Participants underwent a structured interviewer-administered survey that elicited information on demographics, drug use, drug markets, health and treatment utilization, blood-borne virus and injecting risk. Ethics approval for the national IDRS collection was obtained from the University of New South Wales Human Research Ethics Committee.

Participant groupings by use of methamphetamine and crystal methamphetamine

Participants were divided into three groups according to the nature of their substance use in the past six months:

  i) No methamphetamine use (NoM).
 ii) Methamphetamine use but no crystal methamphetamine use (OM).
iii) Crystal methamphetamine use (use at least once in the past six months, with or without other methamphetamine use) (CM).

Thus, all members of the OM group used base and/or powder (i.e. speed) forms of methamphetamine, but did not use crystal methamphetamine; while some members of the CM group used only crystal methamphetamine, and others used base and/or speed in addition to crystal methamphetamine.

Measures

Measures included demographics; prevalence and frequency of drug and alcohol use; health service use; and self-report measures of mental health problems. Self-report of psychosis was denoted to be present if participants responded in the affirmative when asked if they had had any mental health problems in the last six months, and then named unprompted the problem as schizophrenia, drug-induced psychosis, or other psychosis. Stimulant dependence was denoted as present if participants scored greater than 4 on the Severity of Dependence Scale (SDS) (Topp & Mattick, 1997) for use of any stimulant (cocaine, methamphetamine, pharmaceutical stimulants) in the past six months. The Kessler Psychological Distress Scale (K10) – a 10-item scale which yields a global score on the basis of anxiety and depression symptom experience over the previous four weeks – was administered as a screening tool for psychological distress (Kessler et al., 2002). K10 scores range from 10 to 50 and can be classified as low (10–15), medium (16–29) and high (30–50); K10 scores in the high range indicate high likelihood of DSM-IV mental disorder (Furukawa, Kessler, Slade, & Andrews, 2003).

Data analysis

Statistical analyses were conducted using SPSS Statistics Version 22 (IBM Corp., 2013). Categorical variables were analysed using logistic regression models. Comparisons were made between the group with crystal methamphetamine use (CM) and the group with any other form of methamphetamine use (OM), in order to explore the correlates of crystal methamphetamine use compared to use of other forms of methamphetamine. Next, comparisons were made between all PWID who reported a diagnosis of psychotic illness, and those who did not; unadjusted variables significant at $p \leq 0.10$ in these analyses were included in a forced-entry multivariable logistic regression analysis model of self-reported psychotic illness.

Results

Demographics

There were 898 individuals included in the analyses (CM group n = 547; OM group n = 77; NoM group n = 274). The CM group were