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Differences in associations between cannabis and stimulant disorders in first admission psychosis

Grant Sara [a,c,f,*], Philip Burgess [b], Gin S. Malhi [c,g], Harvey Whiteford [d], Wayne Hall [e]

[a] InforMH, Mental Health and Drug and Alcohol Office, NSW Health, PO Box 169, North Ryde, NSW 1670, Australia
[b] School of Population Health, Queensland Centre for Mental Health Research, University of Queensland, Brisbane, QLD, Australia
[c] Discipline of Psychiatry, Sydney Medical School, University of Sydney, Sydney, NSW, Australia
[d] Queensland Centre for Mental Health Research, University of Queensland, Brisbane, QLD, Australia
[e] Centre for Clinical Research, University of Queensland, Brisbane, QLD, Australia
[f] School of Population Health, University of Queensland, Brisbane, QLD, Australia
[g] CADE Clinic, Department of Academic Psychiatry, Royal North Shore Hospital, Sydney, NSW, Australia

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ABSTRACT

Background: Substance use in early psychosis is associated with male gender and earlier onset. Evidence about other correlates of substance use is less consistent. Stimulants (e.g. methamphetamine, cocaine) may precipitate psychosis. However the associations of stimulant disorders in early psychosis are difficult to examine because of lower prevalence and overlap with cannabis disorders.
Methods: Hospital records were used to identify 9919 persons aged 15–29 with a first hospital admission with psychosis in New South Wales (NSW), Australia. Correlates of illicit drug disorders, cannabis disorders and stimulant disorders were examined using univariate and multivariate logistic regression.
Results: Half of first psychosis admissions had comorbid substance diagnoses. Cannabis and stimulant disorders were increased more than ten-fold compared to the age-matched Australian population. Stimulant disorders were equally common in women and men and associated with urban location, social advantage and older age at first admission. Cannabis disorders were associated with male gender, younger age and non-metropolitan location. Diagnoses of drug-induced psychoses were more strongly associated with stimulants than with cannabis. Compared to people with cannabis diagnoses alone, those with both cannabis and stimulant disorders were older, more likely to have a diagnosis of drug-induced psychosis and more likely to have comorbid alcohol disorders.
Conclusions: Cannabis is the most commonly used substance in psychosis, and the associations of illicit drug use in psychoses are largely those of cannabis disorders. There are significant differences between the personal, socio-economic and diagnostic correlates of cannabis and stimulant disorders in young people with first admission psychosis.

1. Introduction

Substance use in psychosis is associated with male gender (Rabinowitz et al., 1998; Cantor-Graae et al., 2001; Wade et al., 2005; Crebbin et al., 2009) and earlier onset (Cantor-Graae et al., 2001; Wade et al., 2005; Compton et al., 2011; Large et al., 2011). There are conflicting findings about associations between substance use and symptom severity, urban location, disadvantage, migration and diagnostic subtype (Rabinowitz et al., 1998; Sevy et al., 2001; Wade et al., 2005). Some studies report no relationship with diagnostic subtype (Wade et al., 2005, 2006a), some report more substance use in affective psychoses than in other psychosis subtypes (Rabinowitz et al., 1998) while others report more substance use in non-affective psychoses (Cantwell et al., 1999).

More than one in five young people with psychosis may abuse stimulants (Rabinowitz et al., 1998; Wade et al., 2005; Genetic Risk Outcome in Psychosis Investigators, 2011). Amphetamines stimulate dopamine activity (Hermens et al., 2009) and can trigger psychotic symptoms in healthy volunteers (Angrist et al., 1974), recreational drug users (McKetin et al., 2006) and people with psychotic disorders (Curran et al., 2004). The effects of amphetamines and other stimulants on people with psychosis may be different from or additive to those of cannabis. However, most persons who use stimulants have also used cannabis. Therefore even very large studies of young people with psychosis have not had sufficient power to examine the correlates of stimulant disorders and to assess whether they differ from those of cannabis disorders.

* Corresponding author at: InforMH, Macquarie Hospital, PO Box 169, North Ryde, NSW 1670, Australia. Tel.: +61 2 8877 5120; fax: +61 2 9887 5722.
E-mail address: GRSara@nsccahs.health.nsw.gov.au (G. Sara).

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Using a large, population-based dataset it may be possible to examine a range of possible associations of substance use disorders in early psychosis, and to have sufficient power to examine the associations of stimulant use disorders while controlling for comorbid cannabis disorders. This study identified all first admissions with psychosis for young people aged 15–29 in the state of New South Wales (NSW), Australia, over a seven year period.

2. Method

The study was approved by the NSW Population and Health Services Research Ethics Committee. NSW had an estimated population of 7.27 million persons in 2012, 1.47 million (20%) of whom were aged 15–29 (Centre for Epidemiology and Evidence, 2012).

2.1. First admissions with psychosis

Admissions to NSW state operated hospitals were examined using the NSW Health Information Exchange. The first admission per individual was identified.

Inclusion criteria were (i) the person's first psychosis admission occurred during the study period (July 2005 to June 2012) and (ii) age 15–29 at that admission. Psychosis was identified by ICD-10 diagnosis codes. Drug-induced and affective psychoses were included. Where episodes had multiple psychosis codes a single psychosis diagnosis was derived using the following diagnostic hierarchy: schizophrenia, delusional disorder, schizoaffective disorder, affective psychosis, brief psychosis, drug induced psychosis, and atypical/unspecified psychosis.

The period July 2000 to June 2005 served as a baseline for identification of incident cases. We excluded (i) persons with admissions for psychosis in the baseline period, (ii) same-day admissions, (iii) residents of another country or Australian state/territory, (iv) Organic Psychosis and (v) Schizotypal Disorder.

2.2. Individual substance disorders

Substance disorders were identified by diagnosis codes for abuse, dependence, intoxication or poisoning by alcohol or illicit drugs. Drug induced psychoses were counted as both psychosis and substance use disorder. Amphetamines and cocaine were grouped into a single stimulant category. All individual substance diagnoses were recorded; polydrug disorder was recorded only where this was specifically diagnosed.

2.3. Overlap between cannabis, stimulants and other drug disorders

A composite "Illicit Drug Use Group" variable was created based on the presence of cannabis and/or stimulant diagnoses. This had five mutually exclusive categories; (i) No illicit drug diagnoses, (ii) Cannabis, (iii) Stimulants, (iv) Cannabis plus Stimulants or (v) Other/Polydrug only. Some persons in groups (ii)–(iv) had additional substance diagnoses, including opiate or hallucinogen disorders, however the "Other/Polydrug only" category was applied only where the person had neither cannabis nor stimulant diagnoses.

2.4. Personal variables

Migration status was based on country of birth recorded at index admission. Rurality and disadvantage measures were based on Australian Bureau of Statistics reference data for the statistical local area of residence at index admission.

Binary variables were constructed indicating whether persons had prior hospital admissions with non-psychotic mental health or substance disorders, or prior recorded contact with a NSW public community mental health team. Persons were defined as having acute entry into care if they had no prior hospital or community care for mental health or substance disorders, or only had community mental health contacts in 7 days preceding their first admission with psychosis.

2.5. Analysis

Analyses were conducted using SPSS v20 (IBM Corporation, 2011) and Stata v11 (StataCorp, 2009). Demographic variables and substance disorder prevalence were compared to NSW population rates. Twelve month prevalence rates of substance disorders in the Australian population aged 15–29 were estimated from the Australian National Survey of Mental Health and Wellbeing, 2007, using methods described elsewhere (Australian Bureau of Statistics, 2009; Slade et al., 2009; Sara et al., 2011).

Associations of illicit drug use were examined in two stages. First, univariate odds ratios and 95% CIs were calculated using binary logistic regression analyses conducted separately for candidate demographic, diagnostic and prior care variables, with the presence of any illicit drug diagnosis as the binary dependent variable. Multiple logistic regression was then performed entering all variables with significant univariate associations ($P <= 0.05$) and including alcohol use disorders as a covariate.

Second, the associations of cannabis and stimulants with these independent variables were examined using multinomial logistic regression, with the five-category "Illicit Drug Use Group" as the dependent variable. The first category (No illicit drug use) was the reference group. Possible confounding effects of hallucinogen or polydrug diagnoses were examined by sensitivity analysis.

Multicollinearity for all regressions was tested by examination of variance inflation factors and condition index, achieving a final condition index less than 30 and no condition index loading more than 0.4 for individual variables (Belsley, 1991).

Mean age at first admission for different drug types was compared using one-way ANOVA, with post hoc testing using Tukey's Honestly Significant Difference test.

3. Results

We identified 9919 individuals who met the study criteria. Two thirds (66%) were male (see Table 1). The most common diagnoses at first admission were schizophrenia or delusional disorder (35%), drug induced psychosis (22%), affective psychosis (13%) and atypical or unspecified psychosis (13%).

Half of the group had a comorbid substance use disorder (see Fig. 1), especially cannabis (30%), stimulant (16%) and alcohol (14%) disorders. Cannabis and stimulant disorders overlapped; 857 persons had both cannabis and stimulant diagnoses, representing 29% of 2964 persons with cannabis diagnoses and 56% of 1542 persons with stimulant diagnoses. The Other/Polydrug group ($n = 921$) included 752 persons with a diagnosis of polydrug disorder without specifying other individual substances, hence the estimates for specific individual drugs are underestimates.

By comparison with the aged-matched NSW population (see Table 2) young people with first admissions for psychosis were more likely to be male, to be migrants, to reside in more disadvantaged areas and to live outside of major cities. Young people admitted with psychosis had nearly eight times the odds of having a substance use disorder compared to the Australian population of the same age. There was a greatly increased rate of cannabis disorders and, to a slightly lesser degree, of stimulant disorders when compared to the age matched population. Alcohol disorders were moderately increased. Confidence intervals for these three estimates did not overlap, indicating that these differences were significant (Schenker and Gentleman, 2001).

Table 3 shows univariate and multivariate associations of illicit substance disorders. Comorbid substance use was associated with male gender, younger age, being born in Australia and non-metropolitan residence. The association with younger age was less marked in the multivariate model. There was no univariate association with