Demographic and socioenvironmental predictors of premorbid marijuana use among patients with first-episode psychosis

Luca Pauselli [a,*], Michael L. Birnbaum [b,c], Beatriz Paulina Vázquez Jaime [d,e], Enrico Paolini [f], Mary E. Kelley [g], Beth Broussard [b], Michael T. Compton [a]

[a] Columbia University College of Physicians & Surgeons, Department of Psychiatry, New York, NY, USA
[b] Lenox Hill Hospital, Department of Psychiatry, New York, NY, USA
[c] Zucker Hillside Hospital, Glen Oaks, NY, USA
[d] Instituto Nacional de Psiquiatría Ramon de la Fuente Muñiz, Mexico City, Mexico
[e] Hospital Psiquiátrico Infantil Juan N. Navarro, Mexico City, Mexico
[f] Madonna del Soccorso Hospital, Department of Mental Health, San Benedetto del Tronto, AP, Italy
[g] Emory University, Rollins School of Public Health, Department of Biostatistics and Bioinformatics, Atlanta, GA, USA

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ABSTRACT

Objective: We identified, in subjects with first-episode psychosis, demographic and socioenvironmental predictors of three variables pertaining to premorbid marijuana use: age at initiation of marijuana use, trajectories of marijuana use in the five years prior to onset of psychosis, and the cumulative "dose" of marijuana intake in that same premorbid period.
Methods: We enrolled 247 first-episode psychosis patients and collected data on lifetime marijuana/alcohol/tobacco use, age at onset of psychosis, diverse socioenvironmental variables, premorbid adjustment, past traumatic experiences, perceived neighborhood-level social disorder, and cannabis use experiences. Bivariate tests were used to examine associations between the three premorbid marijuana use variables and hypothesized predictors. Regression models determined which variables remained independently significantly associated.
Results: Age at initiation of cigarette smoking was linked to earlier initiation, faster escalation, and higher cumulative dose of premorbid marijuana use. During childhood, poorer academic performance was predictive of an earlier age at initiation of marijuana use, while poorer sociability was related to more rapid escalation to daily use and a higher cumulative dose. As expected, experiencing euphoric effects was positively correlated with trajectories and cumulative dose, but having negative experiences was unrelated. Traumatic childhood/adolescent experiences were correlated with rapid escalation and amount of marijuana used, but not with age at initiation of marijuana use.
Conclusion: These data expand the very limited literature on predictors of premorbid marijuana use in first-episode psychosis. Given its association with earlier age at onset of psychosis, and poorer outcomes among first-episode patients, prevention and treatment efforts should be further developed.

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1. Introduction

Marijuana is the most consumed illicit drug worldwide (UNODC, 2016). A recent survey on the prevalence of marijuana use in the United States (Hasin et al., 2015) found that past-year prevalence of marijuana use has doubled during the last decade, reaching 9.5% of the nationally representative sample. As widely demonstrated, the risk of psychotic disorders is nearly doubled by marijuana use, especially use in adolescence (Smit et al., 2004), with marijuana use also showing an association with increased symptom severity (Zammit et al., 2008) and earlier onset of psychosis (Compton et al., 2009; Kelley et al., 2016). Saddichha et al. (2010) found a greater association between marijuana use and the development of psychosis than any other substance. Even though extensively discussed in the literature, the exact role of marijuana use in the genesis of psychotic disorders remains unclear. For example, a recent study found that marijuana use moderates the association between genetic risk for schizophrenia and cortical maturation (French et al., 2015). Nevertheless, despite a potential etiological role of marijuana use in the development of psychosis (Burns, 2013; Smit et al., 2004), no solid conclusions have been made about a causal relationship (Minozzi et al., 2010). Furthermore, a better understanding of how patterns of marijuana use are affected by individual-

and social-level determinants is of importance, especially for the planning and development of effective clinical and public policy interventions.

The amount and duration of marijuana consumption can influence the onset of psychosis (Arseneault et al., 2002; Henquet et al., 2005). The clearest demonstration of this dose effect comes from Di Forti et al. (2009), who found that when examining use for the 5years prior to assessment, marijuana users with first-episode psychosis were more likely to have taken marijuana for a longer duration and daily, compared with unaffected controls from the general population. Insufficiently detailed methods used to assess patterns of use are a common limitation of studies examining premorbid use of marijuana. Age at first consumption and trajectories of use are often not specifically addressed. Some studies have considered large-timeframe categories for age at initiation or have not measured specific frequency of use. Others simply compared groups based on presence or absence of use, or a diagnosis of abuse/dependence. In a previous paper (Kelley et al., 2016), we approached premorbid substance use focusing on three variables: (1) age at initiation of marijuana use, (2) trajectories of marijuana use in the five years prior to onset of psychosis, and (3) the cumulative 'dose' of marijuana intake in that premorbid period. We found that escalation of premorbid use in the five years prior to onset was highly predictive of an increased risk for onset; daily use approximately doubled the rate of onset, even after controlling for simultaneous alcohol/tobacco use. We were able to show that cumulative marijuana exposure was associated with an increased rate of onset of psychosis, independent of sex and family history, which is possibly the reason for age at initiation of marijuana use also being associated with age at onset of psychosis.

Marijuana use in early-course psychosis has been found to be strongly and independently associated with being younger, male, unemployed, and single (Barnes et al., 2008; Mueser et al., 1992; Patel et al., 2015; Tosato et al., 2013). Aspects of one's childhood environment are also associated with marijuana use; for example, greater and more persistent use has been found in subjects who grew up in an urban environment compared with those from rural surroundings (Cougnard et al., 2007; Kuepper et al., 2011). Furthermore, childhood trauma and intolerance to normal stress increase the risk of substance misuse (De Bellis, 2002). Both environmental and trauma-related factors influencing marijuana use have also been found to be independently associated with psychosis (Janssen et al., 2004; Krabbendam and van Os, 2005; Pelayo-Terán et al., 2012), with some authors suggesting a synergistic interaction in determining psychotic symptoms (Harley et al., 2010).

As an extension of our prior study (Kelley et al., 2016), the current analysis sought to identify demographic and socioenvironmental predictors of three variables pertaining to premorbid marijuana use. The variables we previously found to be linked to an earlier onset of psychosis are: (1) age at initiation of marijuana use, (2) trajectories of marijuana use in the five years prior to onset of psychosis, and (3) the cumulative 'dose' of marijuana intake in that same premorbid period. We hypothesized that *earlier initiation of marijuana use* would be predicted by male sex, poorer social and academic functioning in the 6–11-year age period, earlier initiation of cigarette smoking, greater childhood trauma exposure, and greater perceived neighborhood-level social disorder. We also hypothesized that both a *more rapid escalation pattern of marijuana use* and *cumulative dose of premorbid marijuana intake* would be predicted by these same variables, as well as a greater Cannabis Experiences Questionnaire (CEQ) pleasurable experiences subscale score and lower CEQ negative experiences subscale scores.

2. Methods

2.1. Setting and subjects

The sample was recruited from consecutively admitted patients with first-episode psychosis, which was operationalized as having received <3months of prior antipsychotic treatment and having never been hospitalized for psychosis earlier than three months prior to index admission, though the vast majority were completely naïve to any psychiatric treatment prior to hospital admission. Patients were drawn from three inpatient psychiatric units in Atlanta, Georgia and three in Washington, D.C. Among 713 subjects referred as potentially eligible or approached due to likely being eligible, a total of 247 (34.6%) were enrolled from August 2008 to June 2013. Inclusion and exclusion criteria are described in the earlier report (Kelley et al., 2016). The subjects referred but not enrolled did not differ from the study sample in terms of age, race, and ethnicity, but there was a higher percentage of females in the excluded group (37.6%, compared to 25.5% of those enrolled).

Diagnoses (based on the *Structured Clinical Interview for DSM-IV Axis I Disorders*; (SCID); First et al., 1996) included: schizophrenia, paranoid type (97, 39%); psychotic disorder, not otherwise specified (38, 15%); schizophrenia, undifferentiated type (33, 13%); schizophreniform disorder (29, 12%); schizoaffective disorder, depressive type (26, 11%); schizophrenia, disorganized type (11, 5%); schizoaffective disorder, bipolar type (5, 2%); delusional disorder (4, 2%); brief psychotic disorder (2, 1%); and schizophrenia, catatonic type (2, 1%). The mean age of the sample was 23.9±4.8years, 184 patients were male (74.5%), and 213 (86.2%) were African American. Other sociodemographic characteristics of the sample are given in Table 1. We found a mean age at onset of psychotic symptoms of 21.7±5.0years. In order to perform the bivariate analyses and build subsequent models, we selected only participants who had used cannabis at least once (214, 86.6%). The most common mode of consumption was smoking joints, not mixed with tobacco.

2.2. Measures and rating scales

2.2.1. Lifetime Substance Use Recall (LSUR)

Information on substance use was obtained using the Lifetime Substance Use Recall (LSUR; Ramsay et al., 2011), an instrument designed specifically for the parent study (Kelley et al., 2016). It has a timeline that is completed collaboratively with the patient, to inform and guide data collection. It indicates the beginning and end of life milestones and activities, and trends in tobacco, alcohol, and drug use. The LSUR interview guide was developed to facilitate collection of calendar-year-specific estimates of tobacco, alcohol, and drug use, beginning with the year of first use and repeating for each year until the present. During Step 1, information is collected on first use, first weekly use, and first daily use of tobacco, alcohol, marijuana, and any other drug that had ever been used. In Step 2, the average number of days of use per month is collected and recorded on the LSUR Scoring Sheet, for each year from the year of first use to present. The validity of the LSUR has been demonstrated, finding medium-to-large effect size (r, ρ, or $d>|0.50|$) associations between key cannabis-related variables from the

Table 1
Sociodemographic characteristics of the sample (N=247).

	Mean	SD
Age (years)	23.9	4.8
Years of education	11.9	2.2
Age at onset of psychosis (n=224)	21.7	5.0
	N	%
Sex		
Male	184	74.5
Female	63	25.5
Race		
African American	213	86.2
Caucasian	19	7.7
Other	15	6.1
Single and never married	213	86.2
Living with parents/relatives	162	65.6
Unemployed in the month prior to hospitalization	169	68.4
Ever incarcerated (n=236)	138	55.9