# Alcohol and Cannabis Use in Urban, African American, First-Episode Schizophrenia-Spectrum Patients: Associations With Positive and Negative Symptoms

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*Received Dec. 15, 2006; accepted April 3, 2007. From the Department of Psychiatry and Behavioral Sciences, Emory University School of Medicine, Atlanta, Ga.*

*This study was supported by a grant from the National Institute of Mental Health to Dr. Compton (K23 MH067589).*

*Results from this study were presented in a poster at the 5th International Conference on Early Psychosis, October 2006, Birmingham, United Kingdom, and in the following abstract: Compton MT, Whicker NE, Hochman K. Alcohol and cannabis use in urban, African American, first-episode psychosis patients: associations with positive and negative symptoms. Schizophr Res 2006;86(suppl):S99.*

*The authors report no additional financial or other relationship relevant to the subject of this article.*

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***Objective:*** On the basis of limited prior research on associations between symptoms and substance use in first-episode psychosis, a retrospective chart review was conducted to test 2 hypotheses: (1) the presence of positive symptoms is associated with alcohol use prior to admission and (2) the absence of prominent negative symptoms is associated with cannabis use prior to admission.

***Method:*** Eligible patients included those admitted for a first episode of psychosis in a public-sector, university-affiliated hospital that serves a predominantly African American, socially disadvantaged, urban population. The 72 patients included in the analysis were 18 to 40 years of age, and all were African American. Using a structured data collection instrument, discharge summaries of consecutively admitted patients from January 2002 to March 2005 were reviewed to extract data on basic demographic and clinical characteristics, the presence of 11 symptoms, and alcohol and cannabis use within 6 months prior to hospitalization.

***Results:*** Alcohol use in the 6 months prior to hospitalization was associated with a higher frequency of positive psychotic symptoms among first-episode patients. Cannabis use was associated with a lower likelihood of having prominent negative symptoms. These associations remained even after controlling for relevant covariates in logistic regression models.

***Conclusion:*** Although the direction of causality cannot be established, the association between positive psychotic symptoms and alcohol use may represent a self-medication effect, whereas the association between lesser negative symptoms and cannabis use may result from the fact that interpersonal deficits and reduced hedonic capacity minimize drug-seeking activities.

*(J Clin Psychiatry 2007;68:1939–1945)*

Co-occurring substance abuse is highly prevalent in individuals diagnosed with schizophrenia and related psychotic disorders. The National Comorbidity Survey found that fewer than half of people with past 12-month co-occurrence of serious mental illness and substance abuse received any treatment in the year prior to interview.[1] Estimates of recent or current substance abuse in schizophrenia range from 20% to 40%.[2–4] Co-occurring substance abuse in the context of schizophrenia is particularly important because it is associated with all of the following: earlier onset of illness, more severe and refractory symptoms, increased rates of relapse and hospitalization, medication nonadherence, unemployment, unstable housing, family relational problems, vulnerability to physical and sexual victimization (for women), violent behavior, suicidal behavior, entanglement with the criminal justice system, human immunodeficiency virus infection, hepatitis B and C virus infections, more frequent emergency room visits, and a range of cognitive deficits.[4–8]

Rates of co-occurring substance use disorders may vary by geographic location. For example, studies conducted in Europe report lower rates of co-occurring substance use disorders than are found in North American samples.[4] As well, certain demographic features are associated with a higher risk of co-occurring substance use in individuals diagnosed with schizophrenia-spectrum disorders. These include male gender, younger age, lower educational attainment, and better premorbid psychosocial

adjustment.[4,9] Recent research suggests ethnic variations in the prevalence of co-occurring substance use within the U.S. population. A study from California revealed a higher risk of co-occurring substance use disorders among African Americans diagnosed with schizophrenia-spectrum disorders than in their European American and Latino counterparts.[10] The present study contributes to this evolving field of research as it focuses entirely on urban, African American patients. Furthermore, rather than addressing co-occurring substance use more generally, the present study focuses on the use of 2 specific substances—alcohol and cannabis—during the 6 months prior to first hospitalization for psychosis.

Alcohol is the most common substance misused by people with schizophrenia. Published rates of alcohol use disorders in first-episode patients vary considerably, but generally range from 10% to 28%.[11–19] This wide range of prevalence rates is likely due to different sample characteristics including variation in diagnoses, treatment setting, geographic location, socioeconomic status, and ethnicity, in addition to differing methods of defining and measuring substance abuse.

Some research suggests an association between positive psychotic symptoms and alcohol use, although data are limited. Unfortunately, the extant research has been plagued with methodological limitations including the grouping together of various substance use disorders, variability in severity and frequency of abuse, and the insensitivity of assessment techniques.[20] Van Mastrigt and colleagues[16] reported more positive symptoms and fewer negative symptoms in first-episode patients using alcohol compared to those not using alcohol. In light of this and several other reports suggesting that positive symptoms may be associated with substance abuse (and the fact that the most commonly abused substance in these studies was alcohol),[15,21] the present study hypothesized a relationship between positive symptoms and alcohol use.

Increasing evidence supports a causal link between the use of cannabis and the risk of developing psychosis.[22] Research suggests that marijuana use during adolescence increases the risk of developing psychosis in adulthood,[23] and both earlier use and heavier use of cannabis are associated with greater elevations in risk.[24] People with schizophrenia who use cannabis have an earlier age at onset, experience more psychotic symptoms, have a poorer response to antipsychotic medication, and have an overall worse prognosis than those who do not.[17,25] Researchers have reported rates of cannabis misuse in the range of 13% to 64% in first-episode samples.[13,14,17,26,27]

However, the presence of prominent negative symptoms generally has been associated with lower rates of substance abuse.[28] Regarding first-episode patients in particular, Compton et al.[27] found a high prevalence of lifetime cannabis dependence (44%) among 18 urban, African American first-episode participants (from the same setting in which the present sample was drawn), as well as significantly lower negative symptom scores in patients meeting criteria for cannabis dependence relative to those without cannabis dependence. The current study sought to further investigate associations between positive and negative symptoms and substance use in a larger sample of first-episode patients drawn from this same setting. In light of additional recent data suggesting that having fewer negative symptoms is associated with cannabis abuse,[29] the second hypothesis of the present study was that a relationship exists between the absence of prominent negative symptoms and cannabis use among first-episode patients.

## METHOD

### Setting and Sample

All participants (N = 72) were admitted for a first hospitalization for a first episode of psychosis. The 2 locked hospital units where the patients were admitted—one a short-stay crisis stabilization unit and the other a longer-stay inpatient milieu unit—are in a large, urban, public-sector, university-affiliated, county hospital in the southeastern United States. This hospital serves a predominantly African American, socially disadvantaged population. All patients are admitted through a psychiatric emergency service that provides initial evaluation and referral to appropriate care settings. The mean ± SD lengths of stay for the crisis stabilization unit and longer-stay milieu unit are 6.7 ± 2.6 (median = 7) and 14.4 ± 8.4 (median = 12) days, respectively.[30] Both inpatient units, as well as the psychiatric emergency service through which all patients are admitted, serve as teaching sites for psychiatry, psychology, and social work trainees.

Eligible patients were those admitted for the first time for a first episode of psychosis, with a clinical diagnosis of any schizophrenia-spectrum disorder (defined here as schizophreniform disorder, schizophrenia, schizoaffective disorder, and psychotic disorder not otherwise specified). All patients were 18 to 40 years of age, and all were African American.

### Procedures

Data for the current study were obtained through a retrospective chart review. In this setting, discharge summaries are dictated and transcribed at the time of hospital discharge, serving to summarize the patient's presentation, recent history, and course of hospitalization. The electronic discharge summaries of consecutively admitted, eligible patients, from January 2002 to March 2005, were reviewed by a board-certified psychiatrist unaware of the hypotheses of this analysis, which were formulated to follow up on preliminary data previously reported from this site that had suggested lower negative symptom scores in first-episode African American patients with

cannabis dependence compared to those without cannabis dependence.[27]

Ethical approval of the study was obtained from the university's institutional review board and the health system's research oversight committee prior to data collection. Data from discharge summaries were abstracted using a standardized, structured data collection instrument. Basic demographic and clinical characteristics, alcohol and cannabis use, and the presence of 11 symptoms were recorded. These specific symptoms (discussed below and shown in Tables 2 and 4) were selected because it was thought by the investigative team that they could be reliably extracted from discharge summaries. Symptoms were coded as present when the discharge summary described evidence of the particular symptom at the time of admission or during hospitalization. Alcohol and cannabis use was defined as any reported use within the 6 months prior to first hospitalization and was operationalized based on any report of such use in the dictated discharge summary. Total antipsychotic medication dosage at discharge was converted to haloperidol equivalents using previously published dose equivalencies.

### Data Analysis

All statistical analyses, including descriptive statistics, bivariate tests ($\chi^2$ tests, Fisher exact tests, independent samples Student t tests, and Spearman correlations), and logistic regression models, were performed using the SPSS 13.0 statistical software package (SPSS Inc., Chicago, Ill.). Whereas bivariate tests examined crude associations between demographic features/clinical characteristics/specific symptoms and alcohol and cannabis use, logistic regression models were used to determine whether the associations between symptoms and substance use would remain significant even after controlling for relevant confounders. Models were constructed on the basis of variables that were significantly associated with alcohol use and cannabis use in bivariate tests. Backward stepwise elimination was used to determine the most parsimonious models that included independently statistically significant predictors.

## RESULTS

Twenty-five of the 72 patients (34.7%) were female. The mean age was 23.4 ± 4.7 years, and the mean number of years of education was 11.5 ± 2.3. The mean length of hospital stay was 15.9 ± 11.3 days, ranging from 3 to 55 days. Patients received diagnoses of schizophreniform disorder (32, 44.4%); schizophrenia, paranoid type (23, 31.9%); schizophrenia, undifferentiated type (5, 6.9%); schizophrenia, catatonic type (1, 1.4%); schizoaffective disorder (3, 4.2%); and psychotic disorder not otherwise specified (8, 11.1%). According to the discharge summaries, 26 of the 72 patients (36.1%) had used alcohol within the last 6 months, and 35 (48.6%) had used cannabis within the last 6 months. Of note, 20 patients (27.8%) had used both alcohol and cannabis, whereas 31 (43.1%) had no report in their discharge summaries of either alcohol or cannabis use over the last 6 months.

Information about discharge medications was available for 71 of the 72 patients. Sixty-five (91.5%) were discharged on treatment with a single antipsychotic agent. Of these patients, 42 were discharged on risperidone, 14 on olanzapine, 5 on quetiapine, 3 on ziprasidone, and 1 on haloperidol. Of the 6 patients discharged on treatment with more than 1 antipsychotic, 3 were discharged on olanzapine and haloperidol, 1 on olanzapine and risperidone, 1 on risperidone and haloperidol, and 1 on risperidone and quetiapine. The mean antipsychotic dose was 9.4 ± 5.5 mg haloperidol equivalents (range, 1.8–30.0), which roughly approximates 5.2 mg of risperidone or 19 mg of olanzapine (haloperidol 10 mg = olanzapine 20 mg = quetiapine 600 mg = risperidone 5.5 mg = ziprasidone 140 mg).[31] The mean dose (in haloperidol equivalents) was greater in 47 male patients (10.8 ± 5.9) than in 24 female patients (6.6 ± 3.2; $t = 3.24$, $df = 69$, $p < .01$). Dose was inversely correlated with age ($\rho = -0.25$, $p = .04$) and directly correlated with length of hospital stay ($\rho = 0.50$, $p < .01$).

Demographic and clinical characteristics of first-episode patients using and not using alcohol in the 6 months prior to admission are shown in Table 1. Whereas only 5 of 26 patients using alcohol were female (19.2%), 20 of 46 patients not using alcohol were female (43.5%) ($\chi^2 = 4.31$, $df = 1$, $p = .04$). Twenty of the 26 patients using alcohol also used cannabis (76.9%), compared to 32.6% of those not using alcohol ($\chi^2 = 13.06$, $df = 1$, $p < .01$). There was a trend for alcohol-using patients to be younger (22.1 ± 3.3 years) than those not using alcohol (24.1 ± 5.1 years; $t = 1.95$, $df = 62.1$, $p = .06$). Patients using alcohol in the last 6 months did not differ from nonusing patients with respect to any of the following: years of education completed, how the patient was brought to the hospital, discharge Global Assessment of Functioning (GAF) scale score, length of hospital stay, cocaine use in the last 6 months, family history of psychosis, use of seclusion or restraints during hospitalization, whether or not the initial antipsychotic was changed, antipsychotic dosage at discharge, legal status at discharge, or degree of insight at discharge.

The frequencies of the 11 symptoms were compared in patients who had used and who had not used alcohol in the 6 months prior to hospitalization (Table 2). The presence of 5 of these symptoms (auditory hallucinations, visual hallucinations, delusions, paranoia, and homicidal ideation) significantly differed ($p \leq .05$) between the 2 groups. In each instance, those using alcohol were more likely to exhibit these positive or aggressive symptoms.

Demographic and clinical characteristics of patients using and not using cannabis in the past 6 months are shown

**Table 1. Demographic and Clinical Characteristics of First-Episode Patients Using and Not Using Alcohol in the Past 6 Months (N = 72)**

| Characteristic | Alcohol Use (N = 26) | No Alcohol Use (N = 46) | Test Statistic | df | p |
|---|---|---|---|---|---|
| Gender, N (%), female | 5 (19.2) | 20 (43.5) | $\chi^2 = 4.31$ | 1 | .04 |
| Age, mean ± SD, y (N = 69) | 22.1 ± 3.3 | 24.1 ± 5.1 | t = 1.95 | 62.1[a] | .06 |
| Years of education completed, mean ± SD (N = 50) | 11.0 ± 2.4 | 11.8 ± 2.3 | t = 1.20 | 48 | .24 |
| Brought in by, N (%) (N = 58) | | | | | |
| Family/friends/self | 14 (66.7) | 18 (48.6) | $\chi^2 = 1.76$ | 1 | .19 |
| EMS/ambulance/mobile crisis/police/911 | 7 (33.3) | 19 (51.4) | | | |
| Discharge GAF score, mean ± SD (N = 56) | 49.4 ± 11.5 | 47.7 ± 14.5 | t = 0.44 | 54 | .66 |
| Length of stay, mean ± SD, d (N = 70) | 18.4 ± 11.2 | 14.7 ± 11.3 | t = 1.33 | 68 | .19 |
| Cannabis use within last 6 mo, N (%) | 20 (76.9) | 15 (32.6) | $\chi^2 = 13.06$ | 1 | < .01 |
| Cocaine use within last 6 mo, N (%) | 5 (19.2) | 2 (4.3) | $\chi^2 = 4.19$ | 1 | .09[b] |
| Family history of psychosis, N (%) (N = 40) | 8 (61.5) | 15 (55.6) | $\chi^2 = 0.13$ | 1 | .72 |
| Use of seclusion or restraints, N (%) | 4 (15.4) | 4 (8.7) | $\chi^2 = 0.75$ | 1 | .45[b] |
| Initial antipsychotic changed, N (%) (N = 70) | 6 (23.1) | 12 (27.3) | $\chi^2 = 0.15$ | 1 | .70 |
| Antipsychotic dosage at discharge, in haloperidol equivalents, mean ± SD (N = 71) | 10.5 ± 5.8 | 8.7 ± 5.3 | t = 1.28 | 69 | .21 |
| Involuntary or AMA legal status at discharge, N (%) (N = 68) | 9 (39.1) | 18 (40.0) | $\chi^2 = 0.01$ | 1 | .95 |
| Poor insight at discharge, N (%) (N = 53) | 8 (44.4) | 18 (51.4) | $\chi^2 = 0.23$ | 1 | .63 |

[a]Equal variances not assumed due to a significant Levene's test for equality of variances.
[b]Fisher exact test used due to 1 or more cells with expected counts less than 5.
Abbreviations: AMA = against medical advice, EMS = emergency medical service, GAF = Global Assessment of Functioning.

**Table 2. Symptoms of First-Episode Patients Using and Not Using Alcohol in the Past 6 Months (N = 72)**

| Symptom | Alcohol Use (N = 26), N (%) | No Alcohol Use (N = 46), N (%) | Test Statistic ($\chi^2$)[a] | p |
|---|---|---|---|---|
| Auditory hallucinations | 23 (88.5) | 24 (52.2) | 9.65 | < .01 |
| Visual hallucinations | 11 (42.3) | 5 (10.9) | 9.50 | < .01 |
| Delusions | 23 (88.5) | 29 (63.0) | 5.35 | .02 |
| Paranoia | 22 (84.6) | 27 (58.7) | 5.13 | .02 |
| Disorganized thinking | 10 (38.5) | 21 (45.7) | 0.35 | .55 |
| Prominent negative symptoms | 5 (19.2) | 15 (32.6) | 1.48 | .22 |
| Bizarre/inappropriate behavior | 9 (34.6) | 17 (37.0) | 0.04 | .84 |
| Suicidal ideation | 8 (30.8) | 6 (13.0) | 3.33 | .07 |
| Homicidal ideation | 4 (15.4) | 1 (2.2) | 4.49 | .05[b] |
| Manic symptoms | 4 (15.4) | 3 (6.5) | 1.49 | .24[b] |
| Depressive symptoms | 7 (26.9) | 10 (21.7) | 0.25 | .62 |

[a]df = 1.
[b]Fisher exact test used due to 1 or more cells with expected counts less than 5.

in Table 3. Whereas only 7 of 35 (20.0%) patients using cannabis were female, 18 of 37 (48.6%) patients not using cannabis were female ($\chi^2 = 6.51$, df = 1, p = .01). Cannabis-using first-episode patients were younger (22.2 ± 3.1 years) than those not using cannabis (24.6 ± 5.6 years; t = 2.22, df = 54.1, p = .03). Patients using cannabis were also more likely to use cocaine ($\chi^2 = 4.27$, df = 1, Fisher exact p = .05). Patients using cannabis in the last 6 months did not differ from nonusing patients with respect to any of the following: years of education completed, how the patient was brought to the hospital, discharge GAF score, length of hospital stay, family history of psychosis, use of seclusion or restraints during hospitalization, whether or not the initial antipsychotic was changed, antipsychotic dosage at discharge, legal status at discharge, or insight at discharge.

Again, the frequencies of the 11 symptoms were compared across the 2 groups (Table 4). Patients who had used cannabis in the 6 months prior to hospitalization were less likely to have prominent negative symptoms (17.1%), compared to those who did not use cannabis (37.8%; $\chi^2 = 3.84$, df = 1, p = .05). The 2 patient groups did not differ with respect to positive, disorganized, manic, or depressive symptoms.

Logistic regression models were calculated to determine whether these associations between specific symptoms and alcohol and cannabis use would remain significant even after controlling for relevant confounders. In the model assessing factors associated with alcohol use, 8 independent variables were entered, based on significant or near-significant findings in the bivariate tests: gender, age, cannabis use, auditory hallucinations, visual hallucinations, delusions, paranoia, and homicidal ideation. Using backward stepwise elimination, 4 variables remained independently significant predictors: cannabis use (B = 2.78, SE = 0.85, p = .001), auditory hallucinations (B = 2.83, SE = 1.04, p = .006), visual hallucinations (B = 2.31, SE = 0.93, p = .01), and paranoia

**Table 3. Demographic and Clinical Characteristics of First-Episode Patients Using and Not Using Cannabis in the Past 6 Months (N = 72)**

| Characteristic | Cannabis Use (N = 35) | No Cannabis Use (N = 37) | Test Statistic | df | p |
|---|---|---|---|---|---|
| Gender, N (%), female | 7 (20.0) | 18 (48.6) | $\chi^2 = 6.51$ | 1 | .01 |
| Age, mean ± SD, y (N = 69) | 22.2 ± 3.1 | 24.6 ± 5.6 | t = 2.22 | 54.1[a] | .03 |
| Years of education completed, mean ± SD (N = 50) | 11.3 ± 2.2 | 11.8 ± 2.4 | t = 0.79 | 48 | .43 |
| Brought in by, N (%) (N = 58) | | | | | |
| Family/friends/self | 16 (57.1) | 16 (53.3) | $\chi^2 = 0.09$ | 1 | .77 |
| EMS/ambulance/mobile crisis/police | 12 (42.9) | 14 (46.7) | | | |
| Discharge GAF score, mean ± SD (N = 56) | 50.4 ± 13.5 | 46.3 ± 13.6 | t = 1.13 | 54 | .26 |
| Length of stay, mean ± SD, d (N = 70) | 13.5 ± 7.9 | 18.2 ± 13.5 | t = 1.79 | 56.8[a] | .08 |
| Cocaine use within last 6 months, N (%) | 6 (17.1) | 1 (2.7) | $\chi^2 = 4.27$ | 1 | .05[b] |
| Family history of psychosis, N (%) (N = 40) | 14 (63.6) | 9 (50.0) | $\chi^2 = 0.75$ | 1 | .38 |
| Use of seclusion or restraints, N (%) | 4 (11.4) | 4 (10.8) | $\chi^2 = 0.01$ | 1 | 1.0[b] |
| Initial antipsychotic changed, N (%) (N = 70) | 6 (17.6) | 12 (33.3) | $\chi^2 = 2.25$ | 1 | .13 |
| Antipsychotic dosage at discharge, in haloperidol equivalents, mean ± SD (N = 71) | 8.71 ± 5.1 | 10.0 ± 5.9 | t = 0.98 | 69 | .33 |
| Involuntary or AMA legal status at discharge, N (%) (N = 68) | 13 (41.9) | 14 (37.8) | $\chi^2 = 0.12$ | 1 | .73 |
| Poor insight at discharge, N (%) (N = 53) | 10 (38.5) | 16 (59.3) | $\chi^2 = 2.29$ | 1 | .13 |

[a]Equal variances not assumed due to a significant Levene's test for equality of variances.
[b]Fisher exact test used due to one or more cells with expected counts less than 5.
Abbreviations: AMA = against medical advice, EMS = emergency medical service, GAF = Global Assessment of Functioning.

**Table 4. Symptoms of First-Episode Patients Using and Not Using Cannabis in the Past 6 Months (N = 72)**

| Symptom | Cannabis Use (N = 35), N (%) | No Cannabis Use (N = 37), N (%) | Test Statistic ($\chi^2$)[a] | p |
|---|---|---|---|---|
| Auditory hallucinations | 26 (74.3) | 21 (56.8) | 2.44 | .12 |
| Visual hallucinations | 10 (28.6) | 6 (16.2) | 1.59 | .21 |
| Delusions | 27 (77.1) | 25 (67.6) | 0.82 | .36 |
| Paranoia | 24 (68.6) | 25 (67.6) | 0.01 | .93 |
| Disorganized thinking | 15 (42.9) | 16 (43.2) | 0.00 | .97 |
| Prominent negative symptoms | 6 (17.1) | 14 (37.8) | 3.84 | .05 |
| Bizarre/inappropriate behavior | 11 (31.4) | 15 (40.5) | 0.65 | .42 |
| Suicidal ideation | 10 (28.6) | 4 (10.8) | 3.62 | .06 |
| Homicidal ideation | 4 (11.4) | 1 (2.7) | 2.12 | .19[b] |
| Manic symptoms | 4 (11.4) | 3 (8.1) | 0.23 | .71[b] |
| Depressive symptoms | 6 (17.1) | 11 (29.7) | 1.58 | .21 |

[a]df = 1.
[b]Fisher exact test used due to 1 or more cells with expected counts less than 5.

(B = 2.73, SE = 1.03, p = .001). Thus, the presence of 3 positive psychotic symptoms was associated with alcohol use during the 6 months prior to first hospitalization. The Cox and Snell $R^2$ (an approximation of the ordinary least squares $R^2$ used for logistic regression) for this model was 0.45.

In the model assessing factors associated with cannabis use, 6 independent variables initially were entered: gender, age, alcohol use, cocaine use, prominent negative symptoms, and suicidal ideation. Age, cocaine use, and suicidal ideation were excluded in a backward stepwise fashion. The resulting model included 3 independent variables: gender (B = 1.49, SE = 0.65, p = .02), alcohol use (B = 2.14, SE = 0.67, p = .001), and negative symptoms (B = –1.45, SE = 0.70, p = .04). Thus, even when controlling for gender and alcohol use, the absence of prominent negative symptoms was associated with cannabis use during the 6 months prior to first hospitalization. The Cox and Snell $R^2$ for this model was 0.31.

## DISCUSSION

Consistent with the study hypotheses, in this sample of first-episode African American patients, the presence of positive symptoms (including auditory hallucinations, visual hallucinations, and paranoia) was associated with alcohol use prior to admission, and the absence of prominent negative symptoms was associated with cannabis use prior to admission. Although the use of cocaine in the context of first-episode psychosis is also of critical importance, the limited number of patients in the present sample with evidence of cocaine use over the past 6 months (7, 9.7%) precluded examination of factors associated with use of this substance.

The association between positive psychotic symptoms and alcohol use could be consistent with a self-medication hypothesis, although the association is likely multi-determined. Some patients may find relief from disturbing psychotic experiences through alcohol's

sedating effects. The relation between the symptoms of schizophrenia and alcohol use is undoubtedly very complex. Nonetheless, this study suggests some important associations even in young adults who are very early in the course of the illness. Remarkably, in the logistic regression model, 3 positive psychotic symptoms were independently associated with alcohol use.

The association between the absence of prominent negative symptoms and cannabis use is also complex. Being an illicit substance, cannabis is more difficult to procure than alcohol, and individuals with poor social functioning and prominent negative symptoms most likely would have some difficulty obtaining it. This hypothesis is supported by research finding that those using substances in general have fewer negative symptoms, more social contacts, and better social and leisure functioning than nonusers.[28] Also, prominent negative symptoms cause motivational and hedonic deficits that would interfere with drive and desire to obtain and use cannabis. Mancini-Marïe and coworkers[32] recently found that patients with schizophrenia and a co-occurring substance use disorder experienced stronger emotional reactions during a research paradigm consisting of viewing negative pictures, compared to patients without co-occurring disorders. Patients with schizophrenia who had a substance use history showed increased cerebral activation in the medial prefrontal cortex, suggesting that brain regions thought to be impaired in patients with prominent negative symptoms may be more preserved in dually diagnosed patients. Several additional explanations should be considered; for example, patients with prominent negative symptoms may find that the effects of cannabis (e.g., mellowing and apathy) worsen preexisting affective deficits, which could deter further use.

Although some previous reports have suggested an association between substance use and depressive symptoms in the early course of psychosis,[33] the present study did not find associations between depressive symptoms and the use of either substance. Nonetheless, further research addressing depression, negative symptoms, and their associations with substance use is warranted.

These findings should be interpreted in light of several methodological limitations. First, given the homogeneous nature of the sample, generalizability may be limited. Restricting the study sample to African Americans precluded the ability to examine relationships between race/ethnicity and the study variables of interest. However, the homogeneity of the sample provides enhanced internal validity. Second, this study focused on hospitalized patients. First-episode patients successfully treated in outpatient settings may be different with respect to symptom profiles and substance use, and it cannot be excluded that symptoms and substance use are associated differently in samples from outpatient settings compared to inpatient samples. Third, using a retrospective chart review as a research design confers certain obvious limitations. Variables were based on the clinicians' report in their discharge summaries, which may lead to measurement inaccuracy. Yet, the significance of the findings using this less-than-ideal research design suggests that the associations demonstrated may be fairly robust. Fourth, the direction of causality cannot be determined due to the cross-sectional design. For example, it cannot be excluded that alcohol use could have led to higher positive symptoms (an exacerbation effect as opposed to a self-medication effect). It also cannot be excluded that cannabis use ameliorates negative symptoms, thus accounting for the present finding, although this explanation seems less likely. Furthermore, a common factor hypothesis would suggest that symptomatology and substance use diathesis share common etiologic factors. Prospective studies would be required to sort out the complex relations between positive and negative symptoms of schizophrenia and use of specific substances.

Aside from these important limitations, the present study provides preliminary evidence for the relative specificity of associations between symptom domains and use of particular common substances. Further research is needed to examine a range of issues relating to the needs of individuals experiencing a first episode of psychosis who have co-occurring substance use disorders. Ideally, researchers conducting prospective studies will employ multimodal substance abuse assessment techniques and will seek to separate the clinical correlates of abuse of specific substances. It also will be important to carefully document symptom development and the frequency and severity of substance use in order to more fully understand the relationship between symptom clusters and specific substances. Further, the impact of specific psychopharmacologic agents and psychosocial treatments on both the symptoms of the psychotic illness itself and the course of the co-occurring substance use disorders is worthy of more research attention. Finally, future research should continue to examine these issues in specific cultural and ethnic groups, especially underrepresented, socially disadvantaged, minority populations.

***Drug names:*** haloperidol (Haldol and others), olanzapine (Zyprexa), quetiapine (Seroquel), risperidone (Risperdal), ziprasidone (Geodon).

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