Patterns of Current and Lifetime Substance Use in Schizophrenia

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Abstract

A structured interview and standardized rating scales were used to assess a sample of 194 outpatients with schizophrenia in a regional Australian mental health service for substance use, abuse, and dependence. Case manager assessments and urine drug screens were also used to determine substance use. Additional measurements included demographic information, history of criminal charges, symptom self-reports, personal hopefulness, and social support. The sample was predominantly male and showed relative instability in accommodations, and almost half had a history of criminal offenses, most frequently drug or alcohol related. The 6-month and lifetime prevalence of substance abuse or dependence was 26.8 and 59.8 percent, respectively, with alcohol, cannabis, and amphetamines being the most commonly abused substances. Current users of alcohol comprised 77.3 percent and current users of other nonprescribed substances (excluding tobacco and caffeine) comprised 29.9 percent of the sample. Rates of tobacco and caffeine consumption were high. There was a moderate degree of concordance between case manager determinations of a substance-use problem and research diagnoses. Subjects with current or lifetime diagnoses of substance abuse/dependence were predominantly young, single males with higher rates of criminal charges; however, there was no evidence of increased rates of suicide attempts, hospital admissions, or daily doses of antipsychotic drugs in these groups compared with subjects with no past or current diagnosis of substance abuse or dependence. Subjects with a current diagnosis of substance use were younger at first treatment and currently more symptomatic than those with no past or current substance use diagnosis. The picture emerging from this study replicates the high rate of substance abuse in persons with schizophrenia reported in North American studies but differs from the latter in finding a slightly different pattern of substances abused (i.e., absence of cocaine), reflecting relative differences in the availability of certain drugs.

Key words: Substance abuse, alcohol, cannabis.
Schizophrenia Bulletin, 24(3):443-455, 1998.

The problem of schizophrenia and substance abuse comorbidity has attracted considerable attention in recent years (Mueser et al. 1992a; Westermeyer 1992; Selzer and Lieberman 1993; Smith and Hucker 1994). In an epidemiological study of the community prevalence of mental disorders, the rate of substance abuse or dependence comorbidity among patients with schizophrenia was estimated at 47 percent (Regier et al. 1990). However, most estimates of the nature and extent of substance abuse in association with schizophrenia are based on clinical populations of patients.

A literature search using the selection criteria of Mueser et al. (1990)—a minimum sample size of 15, subjects not selected on the basis of a history of substance abuse, specification of the class of substance used—was undertaken to identify all studies that have examined the prevalence of substance use in schizophrenia. Among the 32 studies identified, findings varied widely. Lifetime rates of abuse and/or dependence varied between 12.3 and 50 percent for alcohol (Alterman et al. 1981; Drake et al. 1990), 12.5 and 35.8 percent for cannabis (Cohen and Klein 1970; Barbee et al. 1989), 11.3 and 31 percent for stimulants (Barbee et al. 1989; Mueser et al. 1992b), 5.7 and 15.2 percent for hallucinogens (Breakey et al. 1974; Barbee et al. 1989), 2 and 9 percent for opiates (Siris et al. 1988; Mueser et al. 1992b), and 3.5 and 11.3 percent for sedatives (McLellan and Druley 1977; Barbee et al. 1989). Although difficult to interpret because of variations in sample size, subject selection, diagnostic criteria, and

definitions of abuse and dependence, there was some suggestion of changes in the patterns of substance use over time. For instance, estimates of lifetime alcohol abuse and dependence appear to have increased from 14 to 22 percent in the 1960s and 1970s (Parker et al. 1960; Pokorny 1965; McLellan and Druley 1977) to 25 to 50 percent in the 1990s (Drake et al. 1990; Dixon et al. 1991; Mueser et al. 1992*b*), as have those of stimulant abuse or dependence, which moved from 11 to 15 percent in the 1970s (Breakey et al. 1974; McLellan and Druley 1977) to 17 to 31 percent in the 1990s (Dixon et al. 1991; Mueser et al. 1992*b*). However, estimates of lifetime hallucinogen abuse and dependence appear to have declined from 9.9 to 15.2 percent in the 1970s (Breakey et al. 1974; McLellan and Druley 1977) to 6 to 8 percent in the 1990s (Dixon et al. 1991; Mueser et al. 1992*b*), while comparable estimates for cannabis have shown little change over time. Although the data are too sparse to form opinions on changes in lifetime opiate or sedative abuse and dependence, there is little indication of change.

Substance Abuse and the Course of Schizophrenia.
Several investigators have found associations between the course of schizophrenia and substance abuse, although the direction of influence is unclear. Schizophrenia with substance abuse has been associated with: younger males (Mueser et al. 1990; DeQuardo et al. 1994); poor treatment compliance (Drake and Wallach 1989; Pristach and Smith 1990); increased rates of hospital admissions, depressive symptoms (Brady et al. 1990; Drake et al. 1990; Zisook et al. 1992), suicide (Rich et al. 1988), and assaultive behavior (Test et al. 1989; Swanson et al. 1990); instability in accommodations and homelessness (Belcher 1989; Drake et al. 1989*b*, 1990); and increased risk of HIV infection (Seeman et al. 1990; Hanson et al. 1992). Alcohol abuse in particular has been associated with more hospital admissions, greater severity of positive symptoms, increased rates of tardive dyskinesia (Olivera et al. 1990; Dixon et al. 1992; Duke et al. 1994), decreased serum fluphenazine levels (Soni and Brownlee 1991; Soni et al. 1991), and "relative neuroleptic refractoriness" (Bowers et al. 1990). Other studies have found that alcohol-abusing schizophrenia patients are disruptive and disinhibited, but not necessarily more acutely psychotic (Drake et al. 1990). Likewise, no differences in antipsychotic dose have been found between substance-abusing and non-substance-abusing patients with schizophrenia (Miller and Tanenbaum 1989; Duke et al. 1994).

Cannabis abuse has been associated with the exacerbation of psychotic symptoms, increased hospital admissions (Safer 1987; Linszen et al. 1994; Martinez-Arevalo et al. 1994) and increased tardive dyskinesia (Zaretsky et al. 1993). Unexpectedly, Mueser et al. (1990) found that

cannabis-abusing patients with schizophrenia had fewer hospitalizations. They also found that recent cannabis use was not associated with increased psychotic symptoms. Cocaine has emerged as a particular problem in the United States, where it has been found to be associated with increased risk of depression (Weiss et al. 1988; Brady et al. 1990), less severe negative symptoms (Lysaker et al. 1994), and increased hospital readmission (Brady et al. 1990), yet in a large inpatient study, Mueser et al. (1990) found no effects of stimulant abuse on psychotic symptoms or other clinical variables.

Methodological Issues. Interpretating findings in relation to prevalence and clinical consequences involves a number of problems, not the least of which is their limited generalizability. Most of the studies are North American, where the patterns of drug availability and health care provision are extremely varied and tend to differ from those of other countries (Drake et al. 1991; Johnson and Muffler 1997). There is clearly a need for local surveys to gauge the nature and extent of local problems and how best to deal with them.

Several methodological problems have hampered research in this field, among them reduced reliability of the diagnosis of schizophrenia in the presence of concurrent substance abuse (Bryant et al. 1992; Corty et al. 1993); lack of specification of diagnostic criteria (Richard et al. 1985; Rockwell and Ostwald 1988); nonuse of structured clinical interviews (Alterman et al. 1981; O'Farrell et al. 1983; Drake et al. 1989*a*; Pristach and Smith 1990; Seibyl et al. 1993; Shaner et al. 1993); and uncertainty as to the relative contributions of schizophrenia and substance use to impaired functioning (Skinner and Sheu 1982). Also, severe problems associated with substance use may still be found even when *DSM-IV* criteria (American Psychiatric Association 1994) for substance abuse or dependence are not met (Helzer et al. 1978; Dixon et al. 1993), prevalence rates based on self-report questionnaires are consistently higher than those based on interviews (Turner et al. 1992), and there appears to be a differential willingness to report past use over current use (McNagny and Parker 1992).

The population from which a sample is drawn can give inflated prevalence figures for substance abuse. For example, in a sample of outpatients with schizophrenia, Drake et al. (1990) found the current rate of alcohol abuse/dependence to be 25 percent, whereas in a sample of acute inpatients with schizophrenia, Shaner et al. (1993) found a rate of 45 percent. Berkson (1946) suggested that as a result of the additive effects of seeking treatment for each individual disorder, comorbidity will always be higher in clinical samples than in representative community samples. Dufort et al. (1993) have further suggested

that treatment-seeking is a function of both the number and type of disorders. Substance-use disorders are associated with a low probability of seeking treatment, but this probability increases in the presence of other disorders.

Many of the aforementioned difficulties could be reduced if a longitudinal view of the subject is obtained from multiple sources such as families, case managers, hospital and community files, structured interviews, and drug urine screens (Drake et al. 1990; McKenna and Ross 1994).

The Current Study. This study is the first detailed investigation of schizophrenia and substance abuse comorbidity in Australia. The sample size is substantial and comprised entirely of patients living in the community. Some of the methodological shortcomings of earlier studies were overcome by adhering to operational criteria for diagnosing both schizophrenia and substance abuse, by using a structured clinical interview for diagnosis, by considering a wide variety of substances with abuse potential and quantifying their consumption, by using multiple sources of information (patient, case manager, urine samples), and by focusing only on patients receiving treatment in the community. This article reports the prevalence rates for all substances assessed in the study and examines the characteristics of subjects with different histories of substance abuse or dependence.

Methods

Subject Selection. Through the community mental health clinics of the Hunter Area Health Service, we sought to contact all patients of the public mental health services who had a clinical diagnosis of schizophrenia. To be eligible for screening, before entry into the study, potential subjects identified by clinic staff were required to meet the following criteria: probable clinical diagnosis of schizophrenia; absence of mental retardation, major mood disorder, organic brain disease or injury, and acute psychotic symptoms; age between 18 and 60 years; and likely ability to tolerate an extended interview.

Procedures. Case managers were asked to identify potential subjects. They were requested not to approach only those whom they believed to have a substance-abuse problem but to attempt to recruit all patients with schizophrenia on their caseloads who met the above criteria. Patients who agreed to be interviewed by a member of the research team were then introduced to the interviewer who explained the nature of the research project and sought their informed consent. Patients who were not well enough to participate in the study (e.g., exhibiting acute exacerbation of psychotic symptoms) were approached again in 3 to 6 months' time, if their clinical condition

permitted, and asked to participate. Each interview took between 30 and 170 minutes to complete (mean time: 67 minutes). When subjects found the interview process too tiring and requested to terminate the interview before its completion, the interview was suspended but completed within 48 hours. At the end of the interview, each subject was asked to give a urine sample for drug analysis; 98 percent (191/194) agreed.

Researcher Training. Interviews were performed by a graduate research assistant (N.T.C.) who was trained in how to conduct the interview by the first author (I.L.F.). Training initially focused on the Structured Clinical Interview for *DSM–III–R* (SCID–R; Spitzer et al. 1987). During the training phase, the Psychotic Disorders and Substance Use Disorders sections of the SCID–R were used to interview inpatients in an acute psychiatric hospital who had a clinical diagnosis of psychosis who were about to be discharged. The first 10 interviews were performed by both researchers, with consensual diagnoses being determined. The next 18 were performed by each researcher alternatively, with one conducting the interview and both independently scoring the responses. The latter interviews were used to calculate interrater agreement coefficients based on assignments to the three categories: no abuse or dependence, abuse only, and dependence. Across the range of substances assessed in this study, the overall agreement between the raters was 99 percent (unweighted kappa = 0.95).

Instruments. The structured interview used in the study collected demographic data, including frequency of changes in accommodations and history of criminal charges, and clinical information (e.g., duration of illness, frequency of hospitalizations, current psychotropic medications, and number of suicide attempts). Diagnoses of schizophrenia and substance abuse or dependence were made using the relevant sections of the SCID–R. Six-month and lifetime diagnoses of substance abuse and dependence were determined. Nonalcoholic substances that were considered were illicit drugs (cannabis, amphetamines, hallucinogens, heroin, cocaine), caffeine, tobacco, solvents and aerosols, and prescription drugs (benzodiazepines, anticholinergics, antihistamines, barbiturates, opiates, appetite suppressants). Current psychiatric symptoms were assessed using the Symptom Checklist–90–Revised (SCL–90–R; Derogatis 1977). A measure of global personal hopefulness (GPH; Nunn et al. 1996) was included, as well as an estimate of the subject's current social support (Tucker 1982). It should be noted that all of the self-report instruments were administered verbally, within the interview format. Four global ratings comprising estimates of each subject's usage of alcohol and other

substances both during their lifetime and during the prior 6 months, were also obtained from case managers. Following Drake et al. (1990), anchored 5-point severity ratings were used, with point labels based on *DSM–III–R* criteria (American Psychiatric Association 1987) for abuse and dependence. The utility of clinicians' ratings of substance abuse among psychiatric outpatients has been demonstrated by Drake et al. (1990) and, more recently, by Carey et al. (1996).

Pilot Phase. A pilot study using 38 male, consecutive outpatient attenders with schizophrenia was completed in late 1992. Shortcomings identified in the pilot study led to modifications in the protocol for the main study, specifically the addition of measures of caffeine and tobacco consumption, an assessment of GPH (Nunn et al. 1996), global case manager ratings, and a more thorough drug urine screening (e.g., including antihistamines, anticholinergics, and barbiturates). The questions on caffeine consumption asked about use of coffee, tea, chocolate, and cola and were used to generate an index of caffeine intake per day (in milligrams).

Urine Analysis. In the main study, comprehensive urine analyses were performed by the laboratories of the Royal North Shore Toxicology Unit (Sydney) according to the following protocol. Each specimen was subjected to EMIT (enzyme multiplied immunoassay technique) for opiates, cannabinoids, benzodiazepines, amphetamine types, and cocaine. Enzyme dehydrogenase procedures were used to test for alcohol and confirmed by gas chromatography. In addition, all samples were subjected to high-performance thin-layer chromatography after beta-glucuronidase incubation and liquid-liquid extraction. This technique identified a wide range of additional substances, both therapeutic and illicit, including nicotine, anticholinergics, antipsychotics, antihistamines, antiepileptics, antiarrhythmics, antidepressants, and other sympathomimetics. Finally, samples were analyzed by gas chromatography mass spectroscopy for caffeine and all other presumptive positives.

Data Analysis. Analysis was performed using data from the pilot phase and the main study, since the methods in each case were sufficiently similar. Data analysis was undertaken using BMDP (Biomedical Data Package) statistical software (Dixon et al. 1988) on the mainframe computer at the University of Newcastle.

Results

Sample Characteristics. Of the 312 outpatients contacted, 214 (69%) agreed to take part in the study. Of

these potential subjects, 20 met exclusion criteria and were rejected from the study; 194 (62%) completed the interview. Only nine of these subjects (4.6%) were employed, with most of the remainder drawing sickness benefits or a pension (88.7%). The characteristics of the sample are shown in table 1. The prototypical subject was an unmarried 36-year-old male, who had completed 10 years of education or less, and who lived alone in rented accommodations or at home with his parents. There was a high rate of change in accommodations, with 47.4 percent changing their place of residence at least once in the pre-

Table 1. Sample characteristics (*n* = 194)

Characteristic	
Mean age (years)	36.3
Gender, %	
Female	27.3
Male	72.7
Marital status, %	
Never married	67.5
Married or de facto	13.9
Separated or divorced	18.5
Highest education level, %	
10 years' schooling or less	59.2
Completed secondary education	13.4
Technical qualification	21.1
University qualification	6.2
Area of residence, %	
Urban	73.2
Rural or semirural	26.3
Accommodation type, %	
Rented home or unit	41.7
Parent's home	27.8
Own home or unit	11.9
Boardinghouse	7.7
Other	10.8
Persons with whom they live, %	
Alone	35.6
With parents	31.4
With partner and/or other family	20.1
With friends	6.7
Other	6.2
Mean changes in accommodation during previous 2 years	1.2 (range 0–10)
Criminal charges, %	
Any charge	47.9
Property damage	9.8
Breaking and entering	13.9
Driving while intoxicated	17.5
Minor assault	7.7
Major assault	7.2
Drug possession	11.3
Other	16.0

ceding 2 years. Approximately one-half of the sample admitted to having been charged with a criminal offense. The most common offenses were either drug or alcohol related or else were minor property offenses; however, 1 in 14 subjects (7.2%) had been charged with major assault.

Patterns of Substance Use. The 6-month and lifetime prevalence of substance-use disorders is shown in table 2. Overall, approximately 1 in 4 subjects (26.8%) was found to have been diagnosed with substance-use disorder in the preceding 6 months, with 60.3 percent using but not reaching diagnostic criteria for a substance-use disorder. Almost three in five patients (59.8%) had a lifetime diagnosis of substance abuse or dependence. Nearly half of the subjects were found to have a lifetime diagnosis of alcohol abuse/dependence (48.4%), over one-third a lifetime diagnosis of cannabis abuse/dependence (36.0%), and almost one in eight a lifetime diagnosis of prescribed substance abuse/dependence (11.3%). Of the substances listed in table 2, alcohol, cannabis, and amphetamines were clearly the most commonly used. Although opiates, hallucinogens, and solvents/aerosols were currently being used by a small minority, these substances had been more extensively used in the past. In contrast to the U.S. experience (Mueser et al. 1992b; Elangavan et al. 1993; Shaner et al. 1993), cocaine was rarely used in this sample. Prescribed drugs, most commonly benzodiazepines, anti-

cholinergics, and opiates, were infrequently abused relative to illicit substances.

The mean daily caffeine intake for the sample was 404.7 mg (range: 0–2,914 mg), with 17.3 percent of subjects consuming more than 600 mg of caffeine daily (mean = 938.2 mg per day). Tobacco smokers comprised 74.2 percent of the sample: 30.4 percent smoked 20 to 40 cigarettes per day and 39.7 percent smoked more than this amount.

Reasons for Use. Subjects were asked open-ended questions about their "reasons for use" for each category of substance they had used during the preceding 6 months; they could nominate up to three reasons for use, and these were subsequently grouped into four main categories:

- *drug intoxication effects* (e.g., to get "a lift," get "stoned," "high," a "buzz," a "rev," "to feel good," "get the adrenalin going," "get drunk," to "enhance things");
- *dysphoria relief* (e.g., "to relax," "feel happier," "stop the depression," "feel less anxious," "relieve tension," "be calm," "take bad feelings away");
- *social effects* (e.g., "be sociable," "be part of a group," "something to do with friends," "beats the boredom," "to face people better," "fit in with the crowd"); and
- *illness and medication-related effects* (e.g., "to get away from the thoughts," "help forget the . . . hallucina-

Table 2. Current usage (previous 6 months) and lifetime usage of nonprescribed and prescribed substances (n = 194)

Substance	Current usage (previous 6 months) (%)				Lifetime usage (%)			
	No use	Some use	Abuse	Dependence	No use	Some use	Abuse	Dependence
Alcohol	22.7	59.3	2.1	16.0	1.0	50.5	1.5	46.9
Nonprescribed								
Cannabis	70.1	17.0	4.1	8.8	34.0	29.9	7.7	28.3
Hallucinogens	96.9	3.1	0.0	0.0	62.9	29.9	3.1	4.1
Amphetamines	90.2	7.7	1.0	1.0	66.0	20.6	4.1	9.3
Solvents and aerosols	98.5	1.5	0.0	0.0	81.4	14.4	0.5	3.6
Cocaine	100.0	0.0	0.0	0.0	84.5	13.9	0.0	1.5
Opiates	97.4	2.1	0.5	0.0	88.7	8.2	0.5	2.6
Any nonprescribed	70.1	17.0	3.6	9.3	32.5	30.9	6.2	30.4
Prescribed								
Anticholinergics	62.9	35.1	1.0	1.0	27.3	68.0	1.0	3.6
Benzodiazepines	92.3	4.6	1.5	1.5	35.6	57.2	1.0	6.2
Antihistamines	99.5	0.5	0.0	0.0	71.1	26.8	0.0	2.1
Opiates	94.8	3.6	0.0	1.5	77.8	20.1	0.0	2.1
Appetite suppressants	99.5	0.0	0.0	0.5	91.8	7.2	0.0	1.0
Barbiturates	100.0	0.0	0.0	0.0	95.9	3.6	0.5	0.0
Any prescribed	56.7	38.1	2.1	3.1	13.9	74.7	1.0	10.3
Any substance	12.9	60.3	3.1	23.7	0.0	40.2	4.6	55.2

tions," "get away from voices," "relieve the feeling of ill health").

Most caffeine users (78%) and amphetamine users (79%) nominated drug intoxication effects, as described in terms similar to the above, as one of their reasons for use. Half of the users of these drugs (52% and 47%, respectively) also nominated dysphoria relief among their reasons. Tobacco was used both to relieve dysphoria (69%) and for its intoxication effects (62%), and a similar profile emerged for cannabis, with corresponding values of 62 and 41 percent. Alcohol was equally likely to be used for dysphoria relief and for social reasons (58%). Illness-related reasons, including the relief of antipsychotic drug side effects, were nominated by 0 to 9 percent of users across the drug classes that were examined.

Overall, there were minimal differences between substance "users" and substance "abusers" in their stated reasons for using alcohol, cannabis, and amphetamines. However, abusers of alcohol during the preceding 6 months were more likely than users to nominate illness and medication-related reasons for substance use (14.3% vs. 2.6%, $X^2 = 7.25$, $p < 0.01$). Likewise, cannabis abusers were more likely than users to nominate illness and medication-related reasons for substance use (16.0% vs. 0%, $X^2 = 5.51$, $p < 0.05$).

Characteristics of Subjects With Different Substance Use Histories. On the basis of their history of substance abuse or dependence, subjects were allocated to one of three groups: those with no current or past history of abuse or dependence ($n = 78$, 40%); those reporting a history but no current abuse or dependence ($n = 64$, 33%); and those with current (i.e., 6-month) abuse or dependence ($n = 52$, 27%). Table 3 summarizes the analyses that were undertaken to assess differences in the characteristics of these three groups. Only two of the variables in table 3 differentiated significantly between subjects with current substance abuse or dependence and those with a history of abuse or dependence, namely criminal charges (76.9% vs. 56.3%) and current tobacco consumption (94.2% vs. 78.1%). Subjects with a history of substance abuse or dependence were significantly different from the "no abuse or dependence" group on seven of the variables assessed in table 3. The former were younger, more likely to be male, less likely to have been married, more likely to have been charged with a criminal offense, more likely to be smokers, and likely to have reported a higher level of anxiety symptoms and higher global severity index (GSI) scores on the SCL–90–R.

Subjects with a current history of substance abuse or dependence were significantly different from those with no history of abuse or dependence on each of the seven

variables described above. In addition, they were more likely to have changed accommodations during the preceding 2 years, likely to have been first treated for schizophrenia at a younger age, likely to have a higher daily intake of caffeine, and likely to have higher symptom scores on all of the SCL–90–R subscales reported in table 3. There were no significant differences between the three groups in terms of education, area of residence, social support, rates of psychiatric hospitalization, number of suicide attempts, antipsychotic drug dose, or levels of personal hopefulness. Overall, the subjects in this study reported very low levels of personal hopefulness, with a grand mean of 31.05, which is two standard deviations (SDs) below the normative population data reported by Nunn et al. (1996) (mean = 56.07, SD = 12.53).

Review of Diagnostic Assessments. Global case manager ratings were not used during the pilot phase, and in the main study the "Unknown" option was chosen 23 percent of the time (i.e., "Case Manager does not know person OR does not know about client's use of alcohol or other substances"). Furthermore, case managers were more prepared to make ratings for the preceding 6 months than for lifetime usage (alcohol: 87% vs. 76%, $X^2 = 6.05$, $p < 0.05$; other substances: 80% vs. 67%, $X^2 = 5.95$, $p < 0.05$). On the basis of the cases that were rated, there was a moderate level of agreement between the case managers' ratings and SCID–R-based diagnoses of substance abuse or dependence. For example, collapsing the case managers' ratings into two categories, "no substance abuse problems or mild problems" versus "moderate or severe problems" ("related to . . . recurrent dangerous use"), and the interview-based assessments into two categories, "no use or some use" versus "abuse or dependence," there was 83 percent agreement about alcohol-use disorders during the preceding 6 months (kappa = 0.33) and 70 percent agreement for lifetime alcohol-use disorders (kappa = 0.39). The corresponding values for non-alcohol-related substance-use disorders were 78 percent for the preceding 6 months (kappa = 0.27) and 76 percent for lifetime problems (kappa = 0.49). Classification mismatches were evenly distributed for alcohol-use disorders during the preceding 6 months and for lifetime abuse of other substances. By comparison, lifetime alcohol problems were noted by case managers in 36 percent of subjects, compared with 47 percent identified during the interview, whereas the reverse was true for abuse of other substances during the prior 6 months (case managers: 24%; interview: 13%).

Urine screening tests for substances assessed in both the pilot phase and the main study (e.g., cannabis) were based on 176 samples, while those assessed only in the

Table 3. Characteristics of subjects with different histories of substance abuse or dependence (n = 194)

| Variable | History of substance abuse or dependence | | | Pattern of significant differences[1] |
	No abuse or dependence (N)	Past abuse or dependence (P)	Current abuse or dependence (C)	
Sample size	78	64	52	
Mean age (years), %	40.81	34.55	31.83	$F = 17.58^2$ N>P,C
Female	48.7	12.5	13.5	$X^2 = 30.10^2$ N>P,C
Never married	52.6	76.6	78.8	$X^2 = 13.58^3$ N<P,C
10 years' schooling or less	56.4	62.5	59.6	$X^2 = 0.54$
Urban area	67.9	78.1	75.0	$X^2 = 1.97$
Mean social support	2.45	2.66	2.21	$F = 1.71$
Mean changes in accommodations (previous 2 years)	0.82	1.34	1.82	$F = 4.61^3$ N<C
Any criminal charge, %	21.8	56.3	76.9	$X^2 = 17.84^2$ N<P<C
Mean age at first treatment	25.56	23.14	21.42	$F = 6.32^3$ N>C
Mean number of admissions	5.86	4.95	6.60	$F = 0.75$
Mean number of suicide attempts	0.78	1.16	1.51	$F = 1.73$
Mean antipsychotic drug dose (chlorpromazine equivalents)	435.37	521.27	539.51	$F = 1.06$
Mean caffeine intake (mg/day)	356.33	383.28	525.80	$F = 3.14^4$ N<C
Currently smoking tobacco, %	57.7	78.1	94.2	$X^2 = 22.53^2$ N<P<C
Mean global personal hopefulness	28.65	33.0	32.80	$F = 1.88$
Mean SCL–90–R scores:				
Interpersonal sensitivity	0.81	1.14	1.36	$F = 6.96^3$ N<C
Depression	0.88	1.18	1.37	$F = 5.74^3$ N<C
Anxiety	0.51	0.95	1.13	$F = 11.49^2$ N<P,C
Hostility	0.32	0.61	0.84	$F = 8.68^2$ N<C
Paranoid ideation	0.67	1.03	1.38	$F = 9.97^2$ N<C
Psychoticism	0.59	0.91	1.24	$F = 11.00^2$ N<C
Global severity index	0.63	0.96	1.18	$F = 11.90^2$ N<P,C

Note.—SCL–90–R = Symptom Checklist–90–Revised. (Derogatis 1977).

[1]The statistics reported are either overall X^2 (categorical variables) or F-ratios from one-way analyses of variance (continuous variables). The letters following these statistics indicate the pattern of significant differences among the three subgroups using appropriate followup tests (e.g., N<C: subjects with no history (N) of abuse or dependence were significantly lower than those with current (C) abuse or dependence problems).
[2]$p < 0.001$.
[3]$p < 0.01$.
[4]$p < 0.05$.

main study (e.g., antihistamines) were based on 139 samples. The percentages of urine samples that were "positive" for the substances under investigation were (in descending order) caffeine (71.2%, 99/139), nicotine (64.7%, 90/139), cannabis (10.2%, 18/176), benzodiazepines (6.3%, 11/176), alcohol (4.5%, 8/176), antihistamines (4.3%, 6/139), anticholinergics (3.6%, 5/139), opiates (2.8%, 5/176), and amphetamines (2.3%, 4/176). Recent alcohol consumption aside, these rates are generally consistent with the "current usage" profiles in tables 2 and 3.

Overall, for the seven substances listed above and in table 2 (excluding caffeine and nicotine), 27.8 percent of the subjects (49/176) had at least one positive drug urine test. However, only 5 percent of the 1,158 urine screening tests were positive, of which two-thirds (or 3.4% overall) were from subjects who had acknowledged recent use, whereas the remaining one-third (or 1.6% overall) were from subjects who had not reported using that drug during the preceding 6 months. In practice, this amounted to only 18 screening tests (from 18 separate subjects) that might have led to a reclassification of recent usage from nonuser to user: they involved benzodiazepines (6), antihistamines (6), alcohol (2), opiates (2), cannabis (1), and amphetamines (1).

Discussion

The prevalence of substance abuse and dependence found in the present study is comparable to the results of most other studies. Our estimate of lifetime alcohol abuse/dependence (48.4%) was at the upper end of the range reported in recent studies (Drake et al. 1990; Dixon et al. 1991; Mueser et al. 1992*b*), as was that for cannabis (36.0%) (Barbee et al. 1989; Dixon et al. 1989, 1991; DeQuardo et al. 1994), whereas that for amphetamines (13.4%) was at the lower end of the range reported by most North American studies (Barbee et al. 1989; Dixon et al. 1989, 1991; Mueser et al. 1990, 1992*b*; Khalsa et al. 1991; DeQuardo et al. 1994). The only marked difference from North American studies was the low lifetime rate of cocaine abuse/dependence (1.5%) and the complete absence of current cocaine abuse/dependence in our sample, compared with U.S. data (Elangavan et al. 1993; Shaner et al. 1993). The latter finding is likely to reflect the relatively low level of cocaine availability in this country. The extent of tobacco use found in the present study is similar to that reported by others and indicates that this group of patients is at high risk for smoking-related diseases. Likewise, the level of caffeine consumption in a substantial minority would suggest a significant risk of caffeinism, which may adversely affect the patient's clinical condition.

This is the first large-scale study to estimate the rates of abuse of prescribed substances or over-the-counter preparations such as antihistamines. High rates of abuse of these substances relative to nonprescribed substances were not found, the most frequent being benzodiazepines at 3.0 percent (current), which is several times the community prevalence estimates of 0.2 to 0.5 percent (Heather et al. 1989). However, since the rate of positive urine screens for benzodiazepines and antihistamines exceeded the self-report rates, there is evidently some under-reporting of actual use of these substances. The rates of anticholinergic drug abuse/dependence were not high (2.0% current and 4.6% lifetime) relative to the abuse of other substances although this phenomenon has been reported elsewhere (Marken et al. 1996).

The reasons for substance use stated by our subjects run counter to the self-medication hypothesis, except perhaps for those with a pattern of recent alcohol or cannabis abuse who cited illness-related reasons for their heavy use. However, the latter may represent merely a post hoc justification. Overall, these findings are similar to earlier studies in which substance use is described as relieving anxiety, dysphoria, and difficulty socializing (Test et al. 1989; Dixon et al. 1990; Noordsy et al. 1991). The bulk of our data suggests that patients with schizophrenia use/abuse drugs for essentially the same reasons as young people in the general population do, namely to enjoy the experience of intoxication, to escape from emotional distress, or to take part in a social activity.

The fact that almost one-quarter (23%) of the case managers approached were unwilling to rate their clients' substance abuse histories may be an isolated finding, reflecting the local restructuring of community health services that occurred during the course of the present study. Nevertheless, although there was reasonable agreement between case managers' assessments and the research diagnoses, it did not reach the levels found in other studies (Drake et al. 1990; Carey et al. 1996), possibly because in the current study the case managers were untrained. Thus, efforts to train case managers and to heighten their awareness of substance-use problems in their patients may be timely.

The clinical and demographic differences between the subjects with current (6-month) or lifetime abuse/ dependence disorders and those with no current or past substance-use disorders suggest that the former are predominantly single, young males with unstable accommodations, high rates of criminal behavior, and high levels of symptomatology. The earlier age at first treatment for schizophrenia in the current abuse/dependence group may reflect the possibility that early substance abuse brought forward the onset of schizophrenia or exacerbated preexisting symptoms to a level that rendered the individual sufficiently conspicuous as to make treatment imperative. However, the present study cannot confirm this, and the failure to find a similarly early age of illness onset in those with past substance abuse/dependence only does not support this conclusion.

Some studies have suggested that substance abuse is associated with an increased number of hospital admissions (Safer 1987; Drake et al. 1989*a*, 1990; Brady et al. 1990; Duke et al. 1994), although others have not found such an association (Mueser et al. 1990). The failure to find such an association in the present study may be due to the fact that the area in which this study was conducted had extended-hours mobile community teams, which treat most acute psychoses in the patient's home, thereby avoiding hospitalizations that might otherwise have been necessary. Alternative explanations may lie with a public sector selection bias toward more disabled patients overall or the inherent limitations of cross-sectional, retrospective studies compared with longitudinal studies in assessing service utilization. Similarly, the failure to find an association between substance abuse and either higher doses of antipsychotic drugs or increased rates of suicide attempts conflicts with some previous research (Rich et al. 1988; Miller and Tanenbaum 1989; Bowers et al. 1990; Satel et al. 1991; Duke et al. 1994), but not others (Drake et al. 1984; Bartels et al. 1992; Siris et al. 1993). However, a

nonsignificant trend in the direction of more suicide attempts in the substance-abusing groups should be noted (see table 3).

An important factor that may modify the course of schizophrenia with substance abuse is the community setting. In Australia, there is a system of universal health care and income security, including free hospital and community care, subsidized medications, public housing, and pensions for the chronically ill.

Limitations of the Study. Among the limitations of the present study, three issues stand out: the nonrepresentativeness of the sample, the reliance on a single assessment occasion, and the lack of relevant comparison data. Given the 3:1 male:female ratio and the fact that the sample was recruited from public community mental health services, it is clear that this sample was not representative of all persons with schizophrenia in the population. Excluded were patients being treated in the private sector, either by specialists or family physicians, those not in treatment at all, and patients under inpatient care, either short- or long-term. The former two groups, which would be more likely to comprise better functioning individuals, could be expected to have lower rates of substance-use disorders, while acute inpatients would be more likely to have higher rates, judging by previous findings reported for this group (e.g., Mueser et al. 1990). However, the 69 percent response rate for all potential subjects located in the community clinics, the gender ratio, marital status, education level, and accommodations situation all suggest that the sample is likely to be representative of the relatively poor-prognosis patients with schizophrenia who attend public mental health services in the community. If anything, the rates of substance abuse/dependence found in this sample are likely to be underestimates if a significant proportion of those who declined to participate did so for reasons of wanting to conceal their substance-use problems. Given the relative reluctance of individuals to report current use patterns accurately as compared to past use, the rates of current abuse/dependence may also have been underestimated. The finding that 60.3 percent of the sample was currently using substances below the threshold for a diagnosis of abuse or dependence may similarly reflect this reporting bias, or may be due to the relative insensitivity of the diagnostic instrument used.

Although the reliability of determining lifetime substance-use disorders can be questioned, the finding of a more than twofold difference between 6-month and lifetime estimates of prevalence, if taken at the face value, suggests that substance-use disorders are not static in this group, as indeed they are not in the general population, but instead represent a temporary stage in the course of schizophrenia for which risk factors such as age, gender,

marital status, and criminal behavior may be as important as they are in the general population. However, only longitudinal studies can confirm whether this is indeed the case and whether substance abuse is largely a problem in younger male patients that remits, at least temporarily, in at least 50 percent of cases. Longitudinal studies may also enable the predictors of continued abuse versus recurrent abuse versus abstinence or controlled use to be determined so that improved intervention techniques can be devised and more effectively administered.

There have been no Australian epidemiological studies of substance abuse/dependence using a methodology similar to ours with which to directly compare our results. However, national survey data on lifetime use of illicit drugs does provide a useful guide against which to evaluate the overall level of drug use by our subjects. For example, in the 1991 national survey, 38 percent of males reported ever using marijuana (Commonwealth Department of Health, Housing and Community Services 1992), compared with 66 percent of our sample. This pattern was similar for most illicit substances, with the lifetime usage rates in the current study typically being two to three times those reported by males in the general population. Further evidence of a marked difference in substance-use patterns can be found in the urine screen results, which revealed a 10.2 percent rate of cannabis use in the current sample, more than seven times the rate found previously in the Newcastle population (Hancock et al. 1991). To some extent, comparisons with normal populations are misleading since the demographic characteristics of the present sample of patients with schizophrenia in treatment differ substantially from population norms. A relevant comparison group would probably consist of young to middle-aged, predominantly male, single, unemployed persons. Nevertheless, the available figures strongly suggest that the prevalence of substance abuse/dependence in the sample of patients with schizophrenia is substantially higher than in the general community.

Conclusions

A high level of substance use and abuse similar to that in North American studies (except for the pattern of substance use) was found. Substance abusers with schizophrenia in this sample tended to be young males with high rates of criminal offenses. The reasons for substance use were similar to those found in other studies. We saw little evidence that substance abuse adversely affects the course of schizophrenia in this sample, in that there was no increase in hospital admissions, suicide attempts, or prescribed doses of antipsychotic drugs in those with concurrent abuse/dependence. This study highlights the need for local epidemiological and clinical studies of substance

abuse in schizophrenia, to help ensure that therapeutic interventions are targeted more effectively.

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