Alcohol Consumption and the CAGE Test in Outpatients With Schizophrenia or Schizoaffective Disorder and in the General Population

by Manuela Etter and Jean-François Etter

Abstract

We conducted a survey of 151 outpatients with schizophrenia or schizoaffective disorder in Geneva, Switzerland, in 2000, and a mail survey in a representative sample of the general population of Geneva in 1996 (n = 742), to compare alcohol consumption and alcoholism in these two samples. Fewer patients with schizophrenia than participants in the general population drank alcohol daily (9.9% vs. 18.3%, p < 0.001). Excluding participants who said they currently never drank, alcohol consumption was similar in both groups (3 vs. 4 glasses/week, p = 0.22). However, more patients with schizophrenia than participants in the population sample had a CAGE score ≥ 2 (21.2% vs. 10.1%, p < 0.001), indicating a suspicion of alcoholism. Thus, asking about alcohol consumption produced different results from assessing hidden alcoholism with the CAGE. Either patients with schizophrenia underreported their alcohol consumption, or the CAGE produced higher scores in these patients, for any given level of alcohol consumption. Previous research has shown, however, that the CAGE is a valid test in patients with schizophrenia, which suggests that in Geneva, alcoholism is more prevalent in patients with schizophrenia than in the general population.

Keywords: Alcoholism, schizophrenia, schizoaffective disorder, epidemiologic studies.


Alcohol dependence is a great concern for psychiatrists who treat patients with schizophrenia, because of its particularly severe consequences in these patients. Several studies have shown that rates of alcohol abuse and/or dependence are higher in patients with schizophrenia (12% to 55%) than in the general population (5% to 15%) (Helzer and Pryzbeck 1988; Drake et al. 1990; Mueser et al. 1990, 1992; Regier et al. 1990; Dixon et al. 1991; Fowler et al. 1998; Cantor-Graae et al. 2001; Farrell et al. 2001; McCreadie 2002). One of the few direct comparisons of patients with schizophrenia with a sample from the general population showed that the prevalence of harmful use of alcohol was almost twice as high in these patients as in the general population (16% vs. 9%, p = 0.016) (McCreadie 2002). In addition, rates of alcohol abuse and dependence among patients with schizophrenia appear to have increased in recent decades (Fowler et al. 1998), probably because of the deinstitutionalization of these patients in several countries (Cuffel 1992; Mueser et al. 1998).

However, other studies did not confirm the association between alcoholism and schizophrenia (Bernadt and Murray 1986; Schneier and Siris 1987; El-Guebaly and Hodgins 1992). One review concluded that alcohol abuse was no more frequent in patients with schizophrenia than in the general population, but this review was limited to clinical samples (Schneier and Siris 1987). An older U.K. study concluded that patients with schizophrenia drank significantly less than the local general population (Bernadt and Murray 1986), and a more recent U.K. study showed that there were fewer heavy drinkers in inpatients with schizophrenia than in the general population (2% vs. 5%) (Farrell et al. 1998). Furthermore, the severity of dependence and the quantities of alcohol consumed may be less in dual-diagnosis schizophrenia patients compared to other addicts (Mueser et al. 1998). Thus, the association between alcoholism and schizophrenia may not be universal and may not be as strong as for other substances of abuse (Picchioni and Murray 2000).

High prevalence of alcoholism in some studies of patients with schizophrenia may in part be explained by selection bias. Because of Berkson’s fallacy (Berkson 1949), clinical studies may overestimate the prevalence of alcoholism in schizophrenia, because alcoholism increases the likelihood that these patients will receive...

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medical treatment. Furthermore, there is evidence for large between-country variations in the prevalence of alcohol abuse in patients with schizophrenia (Cantor-Graae et al. 2001). Most of the studies are North American and may therefore be of limited generalizability, because the pattern of drug use, availability of social benefits, and accessibility to health care for patients with schizophrenia may differ considerably between North America and Europe (Cantor-Graae et al. 2001; Phillips and Johnson 2001). Relatively few studies on substance abuse in schizophrenia have been conducted outside North America and the United Kingdom, and a recent review concluded that “there is as yet no clear answer to the question of whether and how substance use patterns among patients with schizophrenia really differ from those in the general population, with lack of comparable general population data the main obstacle to drawing clear conclusions” (Phillips and Johnson 2001, p. 271). Thus, it appears useful to conduct comparative studies that include both patients with schizophrenia and a sample of the general population, in countries other than the United States and the United Kingdom.

Even though the prevalence of alcohol abuse in patients with schizophrenia may not be particularly high in all countries, there is overwhelming evidence for its disastrous effects in these patients. Alcohol abuse in patients with schizophrenia is associated with treatment noncompliance, discharge against advice, and a high rate of psychiatric hospitalization (Drake et al. 1989; Gerding et al. 1999; Soyka 2000). In patients with schizophrenia, alcohol abuse is also associated with a poor prognosis; greater severity of positive symptoms, in particular an exacerbation of delusions and hallucinations (Noordsy et al. 1991); and increased rates of tardive dyskinesia (Dixon et al. 1992; Duke et al. 1994). In schizophrenia patients with alcohol abuse, there are also higher rates of violence, criminality, and suicide (Mueser et al. 1998; Soyka 2000; Cantor-Graae et al. 2001; Soyka et al. 2001). Furthermore, high levels of tobacco and alcohol consumption in patients with schizophrenia may explain the twofold increase in rates of pharyngeal cancer in these patients, compared to rates in their relatives (Lichtermann et al. 2001). Alcoholism may also exacerbate problems with housing and homelessness in these patients (Lamb and Lamb 1990), and the cost of alcoholic beverages places a high demand on the already difficult economic situation of most patients with schizophrenia. Finally, substance abuse in mentally ill patients substantially increases the cost of their medical care (Dickey and Azeni 1996).

Alcohol abuse among patients with schizophrenia can be treated effectively in specialized programs (Drake et al. 1993; Moggi et al. 1999; Barrowclough et al. 2001; Graeber et al. 2003). To be treated, alcoholism must first be identified as a problem. Detection of alcoholism in these patients is often difficult because of disturbances of the patients, or because they are unwilling to disclose information about alcohol-related problems (Smith and Pristach 1990; Pristach et al. 1993). Previous research found frequent denial and lack of insight about alcohol-related problems in patients with schizophrenia (Smith and Pristach 1990). For instance, among people with alcohol problems, more patients with schizophrenia than participants in the nonschizophrenia population view themselves as “normal drinkers” who can control their drinking (Smith and Pristach 1990). As a consequence of denial and underreporting, alcohol abuse may remain underidentified in psychiatric treatment settings (Maiisto et al. 2000). Undetected alcoholism in patients with schizophrenia may lead to inappropriate diagnosis and treatment, and less effective therapeutic results (Pristach et al. 1993).

One way to improve the identification of alcohol abuse is to use a screening test. Self-administered questionnaires are particularly suitable because of their brevity and ease of use. In addition, completing a brief questionnaire may be perceived as less threatening than answering questions on alcohol consumption or alcohol-related problems. Among screening tests for alcohol abuse, the CAGE questionnaire is widely used in clinical settings (Ewing and Rouse 1970; Mayfield et al. 1974; Ewing 1984). The CAGE test is an appropriate screening tool for alcoholism in the general population and in primary care outpatients, with high sensitivity and specificity, compared to DSM–III–R criteria (Chan et al. 1994). Consisting of four questions of a nonincriminating nature, the questionnaire is designed to be a reliable indicator of hidden alcoholism. The CAGE test may be appropriate for patients with schizophrenia, because it is shorter than most similar questionnaires and because it was designed to avoid underreporting due to denial. But rating scales to assess alcohol abuse/dependence, including the CAGE, the Michigan Alcoholism Screening Test (MAST), the Self-Administered Alcoholism Screening Test (SAAST), the TWEAK, and the Dartmouth Assessment of Lifestyle Instrument (DALI) questionnaires, have seldom been tested in patients with schizophrenia (Toland and Moss 1989; Smith and Pristach 1990; McHugo et al. 1993; Pristach et al. 1993; Soyka et al. 1993; Rosenberg et al. 1998; Agelink et al. 1999; Lehman et al. 1999; Wolford et al. 1999; Ford 2003). Furthermore, few studies have directly compared the prevalence of alcoholism in patients with schizophrenia and in the general population using the same questionnaires (McCreadie 2002).

The aim of the present study was to compare self-reported alcohol consumption and CAGE scores in a rep-
representative sample of the general population and in a sample of outpatients with schizophrenia or schizoaffective disorder.

Methods

Participants and Data Collection

General population sample. Using a list of random numbers generated by a computer, we drew a representative (random) sample of 1,000 people aged 18 to 70 years from the accessible part of the registry of residents of Geneva, Switzerland, in 1996. We mailed these people a questionnaire on alcohol and smoking, followed by up to four reminder mailings to nonrespondents (Etter et al. 1997, 2004).

Patients with schizophrenia. During 2 months (May and June 2000), all patients attending a regular appointment at a public sector outpatient clinic for psychotic disorders in Geneva were asked to answer a questionnaire. All patients fulfilled ICD–10 (World Health Organization 1992) and DSM–III–R (APA 1987) criteria for schizophrenia or schizoaffective disorder. The diagnosis was made by a psychiatrist, based on definitions of these diseases in ICD–10 and DSM–III–R, but without using a structured clinical interview. Previous research conducted in the same clinic showed that most of these patients (65%) received classical neuroleptics, and 33 percent received atypical neuroleptics. Comorbidity included substance abuse (23% of patients) and depression (21%). Patients of this clinic lived alone (39%), in sheltered homes (30%), with a spouse (16%), or with their mother or father (14%). Most patients (54%) were unemployed, 41 percent had a sheltered job, and 5 percent were regularly employed (Fuciec et al. 2003). Questionnaires were self-administered, but when necessary (in one-third of patients), completion was supervised by a psychiatrist, a psychologist, or a nurse. Before the survey, the questionnaire was pretested in face-to-face interviews with 10 patients.

Questionnaire. We used the same questions in both samples. The questionnaire (in French) covered age and sex, years of education, smoking status, frequency of alcohol consumption during the past 12 months, and average number of glasses of alcohol on the days when participants drank alcohol (table 1). We used the CAGE questionnaire to assess alcohol abuse (Ewing 1984). Originally developed to identify the "hidden alcoholic" in medical settings, the CAGE questionnaire (Ewing and Rouse 1970) is considered a covert measure of alcoholism because it does not directly assess alcohol consumption. CAGE is an acronym for the four questions in this test: cut down, annoyed, guilty, eye opener. The four questions are answered yes (1 point) or no (0 point); thus, the total score ranges from 0 to 4 (table 1).

Internal Consistency. We assessed whether internal consistency coefficients (Cronbach’s alpha) of the CAGE test exceeded 0.7, as recommended (Nunnally and Bernstein 1994), and we compared alpha coefficients in patients with schizophrenia and in the general population sample.

Comparison With a Population Registry. To assess the representativeness of the general population sample, we compared the age and sex distributions in this sample with these distributions in the population aged 18 to 70 in the official registry of Geneva residents (OCSTAT 2000). We compared alcohol consumption in our sample of the general population and in the Swiss Health Survey, which was conducted in 1997 in a nationally representative sample (ISPA 1999).

Statistical Analyses. We used t tests to compare means, Mann-Whitney U tests to compare medians, and chi-square tests to compare proportions.

Results

Participation. Of 1,000 people in the general population sample who were invited to participate, 742 (74%) returned the survey. The age distributions were similar in people who returned the questionnaire and in the population aged 18 to 70 in the official registry of Geneva residents (χ² = 4.7, p = 0.8, data not shown). In the population aged 18 to 70, the proportion of men (48%) was the same in our sample and in the official registry.

Among the 253 patients with schizophrenia or schizoaffective disorder registered at the clinic, 92 (36%) either had no appointment during the study period or dropped out of treatment, 161 (64%) visited the clinic during the study period, and 151 (94% of 161, 60% of 253) answered the questionnaire. Participants were more often diagnosed with schizophrenia (84%) than with schizoaffective disorder (16%).

Comparison of the Two Samples. Compared to participants in the general population, patients with schizophrenia or schizoaffective disorder were predominantly men, they were 6.3 years younger, they had received 1.2 fewer years of education, and they were more likely to be ever-or current smokers (table 1).

Alcohol Consumption. Three times more patients with schizophrenia than participants in the general population said that currently, they never drank alcohol (32.5% ver-
Table 1. Comparison of a representative sample of the general population and of a sample of outpatients with schizophrenia or schizoaffective disorder, Geneva, Switzerland, 1996–1999

<table>
<thead>
<tr>
<th></th>
<th>General population</th>
<th>Patients with schizophrenia</th>
<th>Test statistics</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of participants</td>
<td>742</td>
<td>151</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean age (range)</td>
<td>42.4 (18–71)</td>
<td>36.1 (19–65)</td>
<td>t = 5.3</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Men (%)</td>
<td>48.0</td>
<td>66.2</td>
<td>(x^2 = 16.7)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Yrs of education (range)</td>
<td>13.4 (0–26)</td>
<td>12.2 (4–22)</td>
<td>t = 3.1</td>
<td>0.002</td>
</tr>
<tr>
<td>Current smokers (%)</td>
<td>28.0</td>
<td>70.2</td>
<td>(x^2 = 97.7)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>During the past 12 mos, did you drink alcohol (beer, wine or other spirits)? (%)</td>
<td></td>
<td></td>
<td>(x^2 = 90.8)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Every day or almost (6–7 days/wk)</td>
<td>18.3</td>
<td>9.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Several times per wk (3–5 days/wk)</td>
<td>17.5</td>
<td>4.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1–2 times per wk</td>
<td>24.9</td>
<td>15.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1–3 times per mo</td>
<td>16.7</td>
<td>11.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than once per mo</td>
<td>10.9</td>
<td>25.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>10.4</td>
<td>32.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicate the no. of glasses that you drink, on average, the days when you drink alcohol, mean (SD)</td>
<td>2.0 (1.6)</td>
<td>1.7 (3.0)</td>
<td>t = 1.5</td>
<td>0.14</td>
</tr>
<tr>
<td>CAGE score from 0 to 4, mean (SD)</td>
<td>0.44 (0.89)</td>
<td>0.83 (1.20)</td>
<td>t = 4.4</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CAGE: Have you ever felt you ought to cut down on your drinking? (% “yes”)</td>
<td>15.6</td>
<td>27.2</td>
<td>(x^2 = 10.0)</td>
<td>0.002</td>
</tr>
<tr>
<td>CAGE: Have people annoyed you by criticizing your drinking? (% “yes”)</td>
<td>8.2</td>
<td>17.2</td>
<td>(x^2 = 10.9)</td>
<td>0.001</td>
</tr>
<tr>
<td>CAGE: Have you ever felt bad or guilty about your drinking? (% “yes”)</td>
<td>12.3</td>
<td>24.5</td>
<td>(x^2 = 13.5)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CAGE: Have you ever had a drink first thing in the morning to steady your nerves or to get rid of a hangover? (% “yes”)</td>
<td>2.0</td>
<td>6.0</td>
<td>(x^2 = 7.1)</td>
<td>0.008</td>
</tr>
<tr>
<td>CAGE score ≥ 1 (%)</td>
<td>21.8</td>
<td>37.7</td>
<td>(x^2 = 15.9)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CAGE score ≥ 2 (%)</td>
<td>10.1</td>
<td>21.2</td>
<td>(x^2 = 13.6)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CAGE score ≥ 3 (%)</td>
<td>4.9</td>
<td>11.3</td>
<td>(x^2 = 8.6)</td>
<td>0.003</td>
</tr>
<tr>
<td>CAGE score = 4 (%)</td>
<td>1.3</td>
<td>4.6</td>
<td>(x^2 = 6.9)</td>
<td>0.009</td>
</tr>
</tbody>
</table>

Note.—SD = standard deviation.

sus 10.4%, \(p < 0.001\), and half as many answered that they drank “every day or almost” (9.9% versus 18.3%, \(p < 0.001\)) (table 1). When the two questions on frequency and quantity of alcohol consumption were combined, self-reported weekly alcohol consumption was lower in patients with schizophrenia than in the general population sample: means, 4.9 versus 6.4 glasses/week (\(p = 0.13\)); medians, 0.15 versus 3 glasses/week (\(p < 0.001\)). However, after excluding participants who said they currently never drank, weekly alcohol consumption was similar in the two groups: means, 7.4 versus 7.2 glasses/week (\(p = 0.89\)); medians, 3 versus 4 glasses/week (\(p = 0.22\)). Among participants who drank daily or almost daily (i.e., on 6–7 days/week), average weekly alcohol consumption was higher among patients with schizophrenia: means, 39.9 versus 20.4 glasses/week (\(p < 0.001\)); medians, 26 versus 19.5 glasses/week (\(p = 0.12\)). The frequency of alcohol consumption was comparable in our sample of the general population in Geneva and in the Swiss Health Survey (daily 16%, several times per week 11%, once or twice per week 29%, less than once per week 26%, never 18%) (ISPA 1999).
Internal Consistency of the CAGE Test. Internal consistency of the CAGE test was similar in patients with schizophrenia (Cronbach's alpha = 0.74) and in the general population sample (alpha = 0.70).

CAGE Scores. Each of the four items in the CAGE questionnaire produced more positive answers in patients with schizophrenia than in the general population sample. Twice as many patients with schizophrenia as participants in the general population sample had a CAGE score ≥ 2 (21.2% vs. 10.1%, \( p < 0.001 \)), suggesting possible alcoholism. One in 22 (4.6%) patients with schizophrenia had a CAGE score = 4, indicating a suspicion of severe alcoholism. The author of the CAGE test wrote that "even one positive reply calls for further inquiry" (Ewing 1984, p. 1907; Ewing 1998, p. 1904). Over one-third of patients with schizophrenia and one-fifth of participants in the general population sample had a CAGE score ≥ 1 (37.7% vs. 21.8%, \( p < 0.001 \)).

Analyses in Subgroups. Among both men and women, more patients with schizophrenia than participants in the population sample had a CAGE score ≥ 2 (among men: 24.0% vs. 15.3%, relative risk = 1.6, \( p = 0.06 \); among women: 15.7% vs. 5.5%, relative risk = 2.9, \( p = 0.006 \)). In all age groups (stratified as 18–20, 21–30, 31–40, 41–50, 51–60, and 61–71 years), about twice as many patients with schizophrenia as participants in the general population sample had a CAGE score ≥ 2 (data not shown).

Discussion

This is one of few direct comparisons of CAGE scores and alcohol consumption in patients with schizophrenia and in a sample of the general population, using the same questionnaire (another such comparison can be found in McCreadie 2002). The prevalence of 21.2 percent of alcoholism in patients with schizophrenia, as defined by a CAGE score ≥ 2, was lower than the prevalence of alcohol abuse/dependence observed in a review of 37 studies from 8 countries (range 7%–55%, quartiles 25%, 36%, and 43%) (Cantor-Graae et al. 2001). But most studies in this review were conducted in the United States, where the prevalence of alcohol abuse/dependence in patients with schizophrenia was particularly high (range 21%–55%, quartiles 28%, 37%, and 43%). In contrast, the prevalence of alcohol abuse/dependence in the four European studies included in this review (from three countries: United Kingdom 22%, Ireland 30%, Germany 7% and 24%) was closer to the prevalence of 21.2 percent of CAGE ≥ 2 in schizophrenia patients observed in the present study. This 21.2 percent rate was also close to the rate of 16 percent of current alcohol dependence in an Australian study of outpatients with schizophrenia (Fowler et al. 1998). Another review also found that the prevalence of alcoholism was lower in European and Canadian samples of patients with schizophrenia (20%–33%) than in U.S. samples (30%–50%) (Batel 2000). But comparisons between studies are often difficult, because different studies may use different definitions and measurement methods to assess alcoholism.

Even though CAGE scores were higher in patients with schizophrenia than in the general population, these patients reported drinking alcohol less frequently. Several explanations of this paradoxical result are possible. First, the quantity and frequency of alcohol consumption was assessed for the past 12 months, but the CAGE test does not specify a time limit and can be interpreted as a measure of lifetime prevalence of alcohol-related problems. Thus, the discrepancy between the CAGE and the quantity-frequency measure could be explained by the different time frames covered by these two assessments.

Second, patients with schizophrenia may have under-reported their alcohol consumption. Because of diminished cognitive function, some of them may have been unable to quantify their consumption and may have given inaccurate answers, even without intending to deceive the investigators. However, population surveys are also subject to underreporting, as only about two-thirds of actual alcohol sales are declared in surveys (Lemmens et al. 1998). Patients with schizophrenia may also have under-reported their alcohol consumption because they wanted to avoid being blamed by caregivers. This hypothesis is supported by previous research reporting frequent denial of alcohol-related problems in these patients (Smith and Pristach 1990). Thus, covert evaluations such as the CAGE or the DALI (Rosenberg et al. 1998) would be particularly useful to detect hidden alcoholism in these patients.

On the other hand, in a recent Swedish study in patients with schizophrenia, there was 100 percent agreement between case records and self-reports of current substance abuse (Cantor-Graae et al. 2001). Thus, a third possible explanation is that patients with schizophrenia actually drank less, because they had less money available for alcoholic beverages, or because developmental impairments made them less likely to have the social skills and initiative necessary to obtain large amounts of alcohol (Picchioni and Murray 2000). Furthermore, many patients with schizophrenia live in protected homes, under the supervision of social workers, where they may have restricted access to alcohol. Patients with schizophrenia may also drink less because they follow recommendations of avoiding concomitant use of alcohol and neuroleptic drugs. Low levels of alcohol use and high levels of abstinence in patients with schizophrenia could also be due to...
learning, as these patients quickly learn that alcohol causes them many problems and subsequently modify usage.

But there is a fourth possible explanation. Patients with schizophrenia are particularly dependent on their families, and in Geneva, most of them are supervised by medical staff and social workers. Thus, it is possible that, being less autonomous, these patients experience more pressure and more frequent reproaches about their alcohol consumption (McHugo et al. 1993). Because three of the four CAGE questions reflect social pressure, this test may produce higher scores in patients with schizophrenia than in the general population, for any given level of alcohol consumption.

Thus, the question emerges of whether the CAGE is a valid test in patients with schizophrenia. We found relatively little research assessing the validity of the CAGE in these patients. One study showed that the CAGE had adequate test-retest reliability ($r = 0.80$) in psychiatric outpatients (Teitelbaum and Carey 2000). Another study showed that in patients with schizophrenia, the MAST and CAGE tests performed equally well (CAGE, in men: sensitivity = 82%, specificity = 100%; in women: sensitivity = 63%, specificity = 96%) (McHugo et al. 1993). In a sample of patients with severe mental illness (including 44% of patients with schizophrenia or schizoaffective disorder), the CAGE had moderate specificity (67%) and sensitivity (70%) but performed as well as the MAST and T-ACE tests (Rosenberg et al. 1998). In a sample of patients admitted to a New Hampshire public psychiatric hospital, 56 percent of whom had schizophrenia or schizoaffective disorder, the CAGE performed reasonably well in detecting alcohol abuse (area under the ROC curve [AUC] = 0.72), but the TWEAK (AUC = 0.80) and the T-ACE tests (AUC = 0.76) performed slightly better (Wolford et al. 1999). In the same sample, the clinic exam (AUC = 0.60) performed worse than the CAGE in detecting alcohol abuse (Wolford et al. 1999). In the present study, internal consistency of the CAGE test (Cronbach’s alpha) was similar in both the schizophrenia and general population samples. In addition, two studies identified the same three items (of 25 items in the MAST) as the best items to detect alcohol abuse in patients with schizophrenia (Searles et al. 1990; McHugo et al. 1993): “Do relatives complain about your drinking?” “Do you feel guilty about your drinking?” and “Has drinking created family problems?” The first two items are from the CAGE, which suggests that the CAGE is a valid test in patients with schizophrenia. In the present study, the prevalence of alcoholism in patients with schizophrenia, as defined by a CAGE score $\geq 2$, was similar (21.2%) to the prevalence observed in schizophrenia patients in other European studies (Cantor-Graae et al. 2001) and about twice as high as in the general population, which is similar to what was reported in McCreadie (2002). The similarity of all these studies’ results also suggests that the CAGE gives an accurate estimate of alcoholism in patients with schizophrenia.

However, an older study found that in patients with schizophrenia, the CAGE test produced many false-positive and false-negative results (Mayfield et al. 1974), and a study of elderly patients with schizophrenia found that the CAGE had a low sensitivity (17%) to detect alcohol abuse (Lehman et al. 1999). But the latter study was conducted by a medical student; used a small sample ($n = 41$); and was published as a letter, not as a peer-reviewed paper; also, the performance of the test in older (mean age = 69 years) hospitalized patients may not reflect its performance in all patients with schizophrenia. Given the possible limitations of the CAGE in psychiatric patients, the DALI was developed specifically for people with severe mental illness. In these patients, the DALI performed better than the CAGE (AUC, DALI = 0.84, CAGE = 0.72) (Rosenberg et al. 1998). The Leeds Dependency Questionnaire also seems to perform well in detained psychiatric inpatients (Ford 2003). More studies in diverse samples of psychiatric patients are necessary to assess whether these scales are preferable to the CAGE.

Taken together, available evidence nevertheless suggests that the CAGE is a valid test of alcoholism in patients with schizophrenia. This suggests that in Geneva, alcoholism is more prevalent in patients with schizophrenia than in the general population.

One in four potential participants in our survey of the general population did not return the questionnaire. This raises the question of the representativeness of this sample. However, the age and sex distributions in the general population sample and in the official registry of Geneva residents were similar. In addition, the frequency of alcohol consumption was similar in our study and in a large population-based survey conducted in Switzerland (ISPA 1999). Thus, the distributions of age, sex, and alcohol consumption do not appear to be biased in our sample of the general population. It is difficult to speculate on the existence, size, and direction of any potential nonresponse bias for other relevant variables (Etter and Perneger 1997).

In Geneva, almost all patients who are treated for schizophrenia or schizoaffective disorder receive psychiatric care in public sector institutions. We included 94 percent of patients who visited an outpatient clinic during a 2-month period but excluded patients who were registered but did not visit the clinic during this period (92 of 253, 36%). These 92 patients included compliant patients who had no appointment during the study and noncompliant
patients who dropped out of the treatment. In a previous study conducted in the same clinic, we showed that 9 percent of patients dropped out of treatment (Fuciec et al. 2003). This small dropout rate should only moderately limit the generalizability of the present study. Compared to compliant patients, dropouts included more men, more users of illicit drugs, and more patients living alone or lacking familial support (Fuciec et al. 2003).

We included only outpatients, and our study would underestimate the prevalence of alcohol dependence in schizophrenia if patients most addicted to alcohol were hospitalized. In addition, substance abuse is a risk factor for clinic nonattendance (Fuciec et al. 2003), so our sample may have missed patients with the heaviest alcohol consumption. On the other hand, some inflation in prevalence of alcoholism may be expected in samples drawn from clinical settings compared to samples that include all patients with schizophrenia in a given population, including those who are not currently treated (Berkson’s fallacy) (Berkson 1949). We did not include patients with schizophrenia treated in private practice clinics, but in Geneva, these patients are seldom treated in the private sector. Thus, our results may not apply to all patients with schizophrenia.

Patients completed the questionnaire at the clinic, often under the supervision of a nurse or a psychologist, whereas participants in the general population sample completed the questionnaires at home. The method of data collection (mail vs. in-person) may influence responses to health surveys (O’Toole et al. 1986; Van Campen et al. 1998), but we know of no published data on the influence of assessment method (mail vs. in-person) on assessment of alcohol consumption or alcohol abuse in patients with schizophrenia. Supervision of these patients is necessary because of impairments specific to the disease.

In summary, this study suggests that in Geneva, alcoholism is more prevalent in patients with schizophrenia than in the general population. Because previous research has shown that the clinical examination is not an accurate predictor of alcoholism in patients with severe mental illness (Wolford et al. 1999), a test like the CAGE should be used to screen for alcoholism in psychiatric patients, at least until other tests developed specifically for these patients (e.g., Rosenberg et al. 1998) are definitively proven superior.

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