

# The role of alcohol in suicide: a case-control psychological autopsy study

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## ABSTRACT

**Background.** The purpose of the study was to estimate the proportion of alcohol abuse and dependence (AAD) among suicides and controls, and to compare the incidence of AAD documented by clinicians with diagnoses derived from a research protocol.

**Method.** AAD according to DSM-IV was diagnosed on the basis of interviews with relatives of people who committed suicide and with controls. A total of 427 people who committed suicide during one year were paired by region, gender, age and nationality with controls randomly selected from general practitioners' lists.

**Results.** Alcohol abuse was found in 10% and alcohol dependence in 51% of suicide cases. The corresponding figures for controls were 7% and 14% respectively. AAD was a statistically significant predictor of completed suicides, while abstinence was a significant predictor for female suicides and former use a significant predictor for older male suicides. AAD was diagnosed in 68% of male and 29% of female suicides. Middle-aged (35–59 years) males who committed suicide had the highest risk of alcohol dependence. Among suicide cases only 29% had received a lifetime diagnosis of AAD, against 23% of controls.

**Conclusions.** AAD was significantly more prevalent among suicides than controls. Overall, the proportion of male suicides affected by alcohol was the same in the present psychological autopsy study as in our previous findings for Estonia on the aggregate level, while the share of female suicides with an AAD diagnosis was dramatically higher on the individual level. AAD is markedly underdiagnosed by general practitioners and clinicians.

## INTRODUCTION

One general finding in retrospective studies of suicide is the high proportion of mental disorders (Isometsä *et al.* 1995; Conwell *et al.* 1996; Foster *et al.* 1997). The retrospective psychological autopsy method allows the proportion of alcohol abusers among people who committed suicide to be estimated at an individual level.

Psychological autopsy studies of over 100 unselected suicide cases have shown an association with alcohol abuse and dependence (AAD) for 34–44% of suicides in Asia (Cheng, 1995; Vijayakumar & Rajkumar, 1999), 20% in Australia (Chynoweth *et al.* 1980), 15–43% in Europe (Barraclough *et al.* 1974; Frances *et al.* 1987; Arato *et al.* 1988; Henriksson *et al.* 1993; Foster *et al.* 1999) and 23–47% in the USA (Robins *et al.* 1959; Dorpat & Ripley, 1960; Rich *et al.* 1988).

In their meta-analysis, Arsenault-Lapierre *et al.* (2004) found significant geographical

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differences in the proportion of psychiatric diagnoses among suicides. Moreover, this applied to substance-related disorders separately, with the highest rate (40.1%) found in North America and the lowest (18.6%) in Europe. Case-control studies at the individual level have shown a higher risk of AAD among suicide cases than controls (Cheng, 1995; Foster *et al.* 1999; Vijayakumar & Rajkumar, 1999).

Several aggregate-level studies have demonstrated the association between alcohol consumption and suicide (Skog & Elekes, 1993; Ramstedt, 2001; Nemtsov, 2003). A series of studies by the Wasserman–Värnik group (1994, 1998*a*) examined changes in alcohol consumption and suicide before, during and after the major anti-alcohol campaign during *perestroika* in the former USSR.

In 1984, more than 60 000 males and 15 000 females committed suicide in what were then the Soviet republics. During *perestroika* alcohol consumption fell by 33–53% of the 1984 rate in the Soviet republics (53% in Estonia). Similarly, an overall decline in the suicide rate of 35% (40% for males, 18% for females) was observed throughout the USSR, especially among males aged 25–54 years (Värnik *et al.* 1998). At the aggregate level approximately 60% of male and 26% of female suicides in the Baltic republics (Estonia, Latvia and Lithuania), and 70% and 24% respectively in the Slavic republics (Russia, Ukraine and Belarus), were statistically estimated as being attributable to alcohol (Wasserman *et al.* 1998*b*, 1994). Nonetheless, studies at the aggregate level run the risk of ecological fallacy.

The present study seeks to:

- classify the pattern of alcohol use among people who committed suicide and controls matched by region, gender, age and nationality, while identifying groups characterized by AAD, abstinence, former use and moderate use;
- compare the proportions of diagnoses of alcohol dependence and abuse documented by clinicians before the study (lifetime diagnoses) with research diagnoses applied by a research protocol for suicide cases and controls;
- compare the risk groups of suicide by gender and age, at the individual level, with previous results at an aggregate level.

## SUBJECTS AND METHOD

### Data collection

#### *Subjects and instruments*

Preliminary information about completed suicides was obtained from the police and the Bureau of Forensic Medicine, which permitted interviews to begin 2 months after the suicidal act according to the methodology used in Finland for the National Suicide Prevention Project (Lönnqvist, 1988). The list of suicide cases was verified by data from the Estonian Statistical Office. The procedure of suicide registration has been addressed in our earlier study (Värnik *et al.* 2001). In 1999, a total of 469 suicide cases (ICD-9 codes E950–E959) were registered. In 427 of these cases (91% of the total, representative in terms of region, gender and age), a psychological autopsy study (Shneidman, 1981) based on face-to-face interviews with relatives and intimates of people who had committed suicide, following their signed agreement, was carried out by psychiatrists trained for the study. The average duration of the interview was 1 hour 45 minutes. Interviews were conducted at the interviewee's home in 70% of cases, otherwise at the interviewer's or interviewee's office. Key informants of the deceased were spouses or cohabitantes (33%), parents (21%), adult children (16%), brothers or sisters (10%), and other relatives and friends (20%). The questionnaire used for the semi-structured interviews had been drawn up in Finland and translated into Estonian and Russian. It comprised eight sections, one of which assessed more precisely (39 items) the use of alcohol and other psychoactive substances (Lönnqvist, 1988). Details about the deceased's social connections and working life were collected in other parts of the questionnaire. Additional information was compiled from the medical records in hospital archives. The Karolinska Institute Research Ethics Committee North approved the ethical aspects of the study.

To test the reliability of data obtained from respondents, 2–4 informants per case in 33 randomly selected cases (8%) were interviewed. The minor discrepancies found in the reported amount and frequency of alcohol use, and in the consequences of drunkenness, did not change the research diagnoses.

Table 1. Characteristics of suicides and controls

|                          | Suicides |      | Controls |      |
|--------------------------|----------|------|----------|------|
|                          | <i>n</i> | %    | <i>n</i> | %    |
| Gender                   |          |      |          |      |
| Males                    | 343      | 80.3 | 343      | 80.3 |
| Female                   | 84       | 19.7 | 84       | 19.7 |
| Age group                |          |      |          |      |
| <35 yr                   | 107      | 25.1 | 107      | 25.1 |
| 35–59 yr                 | 198      | 46.4 | 198      | 46.4 |
| ≥60 yr                   | 122      | 28.6 | 122      | 28.6 |
| Nationality              |          |      |          |      |
| Estonian                 | 244      | 57.1 | 244      | 57.1 |
| Russian                  | 183      | 42.9 | 183      | 42.9 |
| Family status            |          |      |          |      |
| Married/cohabiting       | 181      | 42.4 | 268      | 62.8 |
| Not married/cohabiting   | 246      | 57.6 | 159      | 37.2 |
| Socio-economic status    |          |      |          |      |
| Employed                 | 132      | 30.9 | 248      | 58.1 |
| Working illicitly        | 36       | 8.4  | 17       | 4.0  |
| Unemployed               | 94       | 22.0 | 34       | 8.0  |
| Retired (age or disease) | 136      | 31.9 | 101      | 23.7 |
| Other                    | 29       | 6.8  | 27       | 6.3  |
| Total                    | 427      | 100  | 427      | 100  |

The control group ( $n=427$ ) were randomly selected from the lists of general practitioners (GPs) for the period 2002–2003. When the system of GPs was introduced in Estonia in the early 1990s, GP lists were compiled from population registers and all the local residents were thus represented in GPs' lists regardless of whether they had consulted a doctor for any health problems. Controls were paired with suicide cases by region, gender, age ( $\pm 2$  years) and nationality. Interviews with the control group were carried out by GPs trained for the study, using semi-structured questionnaires similar to those used for psychological autopsy. The controls' response rate was 96%.

The mean age of suicide cases was 48.3 ( $\pm 18.5$ ) years and that of controls 48.1 ( $\pm 18.1$ ) years. Males made up 80.3% of the suicide cases and controls (mean age of males: suicides 46.2, controls 46.1) while 19.7% were female (mean age: suicides 56.8, controls 56.4; see Table 1). Altogether, 57.1% were Estonian (mean age: suicides 50.5, controls 50.2) and 42.9% non-Estonian (mean age: suicides 45.3, controls 45.4). Ninety-four per cent of the non-Estonian suicide cases living in Estonia were of Slavic origin: Russian (88%), Ukrainian (7%) and Byelorussian (5%). These people, whose cultural and linguistic background is relatively

homogeneous, are categorized as 'Russians in Estonia' in the present study.

### Diagnoses

One of the author/interviewers (A.V.) coded alcohol-use disorders in all suicide and control cases independently, using a blind method based on psychological autopsy data and medical documentation, according to hierarchical DSM-IV principles (APA, 1994). Alcohol dependence was diagnosed if three or more of the following symptoms had been present at any time over the past 12-month period:

- (1) markedly increased or decreased tolerance of alcohol to achieve intoxication or the desired effect;
- (2) withdrawal syndrome;
- (3) loss of control over the doses or duration of alcohol intake;
- (4) persistent desire or unsuccessful efforts to cut down or control alcohol use;
- (5) much time spent in activities aimed at obtaining alcohol or in recovering from its effects;
- (6) key social, occupational or recreational activities given up or reduced because of alcohol use;
- (7) persistence of alcohol use despite the problems it causes or exacerbates.

Alcohol abuse was diagnosed if a maladaptive pattern of alcohol use had led to clinically significant impairment or distress, as manifested in one or more of four symptoms described in DSM-IV, while never meeting the criteria for alcohol dependence.

The pattern of alcohol use was classified in the following categories:

- (1) alcohol dependence;
- (2) alcohol abuse;
- (3) former alcohol use;
- (4) abstinence;
- (5) moderate alcohol use;
- (6) indistinct cases.

Alcohol users not assigned to categories (1)–(4) above were considered 'moderate'. 'Indistinct cases' were so categorized because of insufficient data. Clinical diagnoses coded according to ICD-10 were available for all suicide cases and controls if the individuals had been

Table 2. Odds ratios of the conditional logistic regression for alcohol use in total and by gender, adjusted for family and socio-economic status

| Alcohol use          | Suicides |      | Controls |      | Adjusted OR | 95% CI   | p value |
|----------------------|----------|------|----------|------|-------------|----------|---------|
|                      | n        | %    | n        | %    |             |          |         |
| Total                |          |      |          |      |             |          |         |
| Alcohol dependence   | 208      | 50.6 | 59       | 14.4 | 11.6        | 6.6–20.7 | <0.0001 |
| Alcohol abuse        | 42       | 10.2 | 29       | 7.1  | 6.8         | 3.4–13.7 | <0.0001 |
| Former alcohol use   | 20       | 4.9  | 20       | 4.9  | 2.8         | 1.2–6.6  | 0.0182  |
| Abstinence           | 42       | 10.2 | 24       | 5.8  | 4.4         | 2.1–9.0  | <0.0001 |
| Moderate alcohol use | 99       | 24.1 | 279      | 67.9 | 1.0         |          |         |
| Total                | 411      | 100  | 411      | 100  |             |          |         |
| Male                 |          |      |          |      |             |          |         |
| Alcohol dependence   | 193      | 57.8 | 59       | 17.7 | 8.7         | 4.9–15.6 | <0.0001 |
| Alcohol abuse        | 35       | 10.5 | 28       | 8.4  | 5.3         | 2.6–11.1 | <0.0001 |
| Former alcohol use   | 16       | 4.8  | 16       | 4.8  | 3.3         | 1.2–8.5  | 0.0167  |
| Abstinence           | 15       | 4.5  | 12       | 3.6  | 2.8         | 0.99–8.0 | n.s.    |
| Moderate alcohol use | 75       | 22.5 | 219      | 65.6 | 1.0         |          |         |
| Total                | 334      | 100  | 334      | 100  |             |          |         |
| Female               |          |      |          |      |             |          |         |
| Alcohol dependence   | 15       | 19.5 | 0        | 0    | —           |          |         |
| Alcohol abuse        | 7        | 9.1  | 1        | 1.3  | —           |          |         |
| Former alcohol use   | 4        | 5.2  | 4        | 5.2  | 0.7         | 0.1–9.6  | n.s.    |
| Abstinence           | 27       | 35.1 | 12       | 15.6 | 8.2         | 1.9–35.9 | 0.0054  |
| Moderate alcohol use | 24       | 31.2 | 60       | 77.9 | 1.0         |          |         |
| Total                | 77       | 100  | 77       | 100  |             |          |         |

OR, Odds ratio; CI, confidence interval; n.s., not significant.

referred to medical institutions before the study. Clinical (lifetime) diagnoses proved to coincide with research diagnoses. The coding results were examined and disagreements between raters were resolved through consensus. Kappa inter-rater reliability was 0.988 ( $p < 0.0001$ ) for suicides and 0.985 ( $p < 0.0001$ ) for controls. There were debatable issues in the diagnosis in four suicide cases and five controls.

### Statistical methods and drop-out

Statistical analysis was performed with SPSS version 11.5 (SPSS Inc., Chicago, IL, USA) and StatsDirect 2.3.7 (StatsDirect, Sale, Cheshire, UK). Since our cases and controls were individually matched, multivariate conditional logistic regression models, adjusted for family and socio-economic status, were applied to assess the effects of alcohol dependence, alcohol abuse, abstinence and former alcohol use on suicide risk. Moderate users of alcohol were used as a referent group.

In the statistical analysis, 12 pairs (3.7%) in which sufficient data on either the suicide cases or the controls were available to make research diagnoses were classified as indistinct and

excluded. Four of the people who committed suicide were prevented from using alcohol in their last 12 months by being in prison or a nursing home. These pairs, too, were excluded from the statistical analysis. Thus, nine pairs of males (2.6%) and seven pairs of females (8.3%) were excluded from the analysis.

## RESULTS

### AAD among suicides and controls

Alcohol abuse was found in 10.2% and alcohol dependence in 50.6% of suicide cases. The corresponding data for controls were 7.1% and 14.4% respectively. Alcohol abuse and alcohol dependence were statistically significant predictors of completed suicides, compared with controls, when moderate alcohol users were selected as a referent group [for alcohol abuse, the adjusted odds ratio (aOR) was 6.8 and the 95% confidence interval (CI) was 3.4–13.7; for alcohol dependence, the aOR was 11.6 and the 95% CI was 6.6–20.7; see Table 2]. Moreover, for both sexes together, both abstinence (aOR 4.4, 95% CI 2.1–9.0) and former alcohol use (aOR 2.8, 95% CI 1.2–6.6) were associated with

Table 3. Odds ratios of the conditional logistic regression for alcohol use among male suicides, by age, adjusted for family and socio-economic status

| Alcohol use                  | Suicides |      | Controls |      | Adjusted OR | 95% CI   | p value |
|------------------------------|----------|------|----------|------|-------------|----------|---------|
|                              | n        | %    | n        | %    |             |          |         |
| <b>Males aged &lt; 35 yr</b> |          |      |          |      |             |          |         |
| Alcohol dependence           | 30       | 32.3 | 10       | 10.8 | 4.6         | 1.4–15.4 | 0.0121  |
| Alcohol abuse                | 16       | 17.2 | 9        | 9.7  | 5.1         | 1.5–16.8 | 0.0076  |
| Former alcohol use           | 4        | 4.3  | 3        | 3.2  | 1.3         | 0.2–11.1 | n.s.    |
| Abstinence                   | 8        | 8.6  | 10       | 10.8 | 2.1         | 0.6–7.8  | n.s.    |
| Moderate alcohol use         | 35       | 37.6 | 61       | 65.6 | 1.0         |          |         |
| Total                        | 93       | 100  | 93       | 100  |             |          |         |
| <b>Males aged 35–59 yr</b>   |          |      |          |      |             |          |         |
| Alcohol dependence           | 122      | 75.8 | 42       | 26.1 | 8.2         | 3.3–19.4 | <0.0001 |
| Alcohol abuse                | 13       | 8.1  | 18       | 11.2 | 3.9         | 1.2–12.7 | 0.0249  |
| Former alcohol use           | 3        | 1.9  | 8        | 5.0  | 3.4         | 0.6–20.2 | n.s.    |
| Abstinence                   | 2        | 1.2  | 2        | 1.2  | 0.9         | 0.1–10.9 | n.s.    |
| Moderate alcohol use         | 21       | 13.0 | 91       | 56.5 | 1.0         |          |         |
| Total                        | 161      | 100  | 161      | 100  |             |          |         |
| <b>Males aged ≥ 60 yr</b>    |          |      |          |      |             |          |         |
| Alcohol dependence           | 41       | 51.3 | 7        | 8.8  | 6.2         | 2.0–9.8  | 0.0018  |
| Alcohol abuse                | 6        | 7.5  | 1        | 1.3  | —           |          |         |
| Former alcohol use           | 9        | 11.3 | 5        | 6.3  | 8.2         | 1.4–46.3 | 0.0176  |
| Abstinence                   | 5        | 6.3  | 0        | 0    | —           |          |         |
| Moderate alcohol use         | 19       | 23.8 | 67       | 83.8 | 1.0         |          |         |
| Total                        | 80       | 100  | 80       | 100  |             |          |         |

OR, Odds ratio; CI, confidence interval; n.s., not significant.

completed suicide. AAD was diagnosed among 68.3% of male suicides and 28.6% of female suicides.

The youngest age group (<35 years) of males who committed suicide had the lowest AAD proportion (49.5%) and middle-aged (35–59 years) males who committed suicide had the highest proportion (83.9%). The latter group also showed the highest risk of alcohol dependence compared with their controls, with moderate users of alcohol used as a referent group (aOR 8.2, 95% CI 3.3–19.4; see Table 3). Abstinence was not associated with suicide for males in the various age groups, while former use was significantly associated with male suicide in the oldest age group (aOR 8.2, 95% CI 1.4–46.3).

According to the research protocol, 58.0% of Estonians and 64.7% of the Russian residents of Estonia who committed suicide had been diagnosed with AAD. The corresponding figures for the controls were 20.2% for Estonians and 23.1% for Russians. In both ethnic groups, with moderate alcohol users as a referent group, alcohol abuse (Estonians: aOR 5.1, 95% CI 1.9–13.5; Russians: aOR 9.9, 95% CI 3.3–30.0) and alcohol dependence (Estonians: aOR 12.2, 95% CI 5.3–28.3; Russians: aOR 12.4, 95% CI

5.2–29.5) were associated with suicide. Former alcohol use was associated with suicide only for Russians (Estonians: aOR 2.4, 95% CI 0.7–8.0; Russians: aOR 3.8, 95% CI 1.0–14.0) and abstinence only for Estonians (Estonians: aOR 25.8, 95% CI 4.5–147.3; Russians: aOR 2.4, 95% CI 0.9–6.3).

#### Difference between medically documented diagnoses and research diagnoses

Among the suicide cases diagnosed with AAD according to the systematic research protocol, only 29% received a lifetime clinical diagnosis according to their clinical record. The corresponding figure for controls was 23%. Of the male suicide cases aged <35 and >60 years who were diagnosed with AAD on the strength of the research protocol, only 25% had a lifetime clinical diagnosis noted in their medical record.

## DISCUSSION

### Methodological considerations

Methodological limitations of psychological autopsy include the possibility of incomplete and biased information (Beskow *et al.* 1990;

Waern *et al.* 2002). Data on suicide cases, collected retrospectively from indirect sources (survivors), may introduce reporter bias due to respondents' possible partiality and other attitudes connected with their personal experience of the victims.

In suicide case-control studies, the control groups' composition is an important issue. There have been studies using living controls and deriving information either from their relatives (Foster *et al.* 1997; Vijayakumar & Rajkumar, 1999) or from direct interviews with the individuals themselves (Conwell *et al.* 1996; Waern *et al.* 2002). Regarding living controls, alcohol abuse can be denied. Phillips *et al.* (2002) designed a psychological autopsy study where controls were people who died from other injuries.

In the present study, direct personal interviews with living controls matched with the suicide cases by region, gender, age and nationality were used. Since more males than females commit suicide and suicides' age composition differs from that of the general population, it is essential to stress that our control group deviates from the general population.

One limitation was a time lag of some 3–4 years between the interviews with relatives of people who committed suicide (1999) and interviews with controls (2002–2003). The implications of this fact are, however, probably minor since matched controls were used and the results were adjusted for family and socio-economic status.

In comparison with other studies (Lesage *et al.* 1994; Appleby *et al.* 1999) the response rate in the present study was high both for suicide cases (91%) and for controls (96%).

'Psychological autopsy' may be regarded as a reliable method for post-mortem psychiatric diagnosis (Brent *et al.* 1993; Kelly & Mann, 1996; Hawton *et al.* 1998; Schneider *et al.* 2004). Several authors (McKeeman & Erickson, 1997; Conner *et al.* 2001; Schneider *et al.* 2004), in making diagnoses using structured interviews, have shown high correlation between self-rating and informant rating. The lack of adjustment for co-morbidity with other Axis I disorders (e.g. major depression; see Cheng, 1995), and also Axis II disorders and other factors may have confounded the repercussions of alcohol-use disorders on suicide risk.

One limitation of the statistical analysis was the low numbers of individuals in some sub-groups (females, and males by age groups), which were reflected in the wide confidence intervals.

## AAD

Various psychological autopsy studies have shown that alcohol-dependent and alcohol abusers represent 15–47% of suicide cases in some countries (Robins *et al.* 1959; Dorpat & Ripley, 1960; Barraclough *et al.* 1974; Chynoweth *et al.* 1980; Arato *et al.* 1988; Rich *et al.* 1988; Henriksson *et al.* 1993; Cheng, 1995; Foster *et al.* 1997; Vijayakumar & Rajkumar, 1999). The results of the present study, with 411 cases, show that 61% of people who committed suicide in Estonia were alcohol-dependent or abusers – a figure considerably higher than those found in other studies with unselected suicide cases.

The proportion of AAD in the present study was found to be higher in male suicides than in female suicides. This is in line with the meta-analysis of Arsenault-Lapierre *et al.* (2004), who found a significantly elevated risk of substance-related disorders among male suicide cases (OR 3.6, 95% CI 2.8–4.6). Compared with the data of our previous findings for Estonia, the proportion of male suicides affected by alcohol found in 1984 (65%, estimated at aggregate level) were broadly unchanged 15 years later (68%, ascertained in the present psychological autopsy study, in 1999). In contrast, the proportion of female suicide cases with AAD diagnoses rose from 5% in 1984 to 29% in 1999 (Wasserman *et al.* 1994, 1998*b*) – a situation calling urgently for further investigation.

As in the Finnish study, the highest overall proportion of AAD was found among middle-aged male suicides (Isometsa *et al.* 1995). In the present study AAD was most prevalent among middle-aged males (aged 35–59 years), for suicide cases and controls alike. This is in line with our previous findings at aggregate level, showing that middle-aged males are most adversely affected by factors contributing to suicide (Värnik *et al.* 1998; Tooding *et al.* 2004).

## Masked AAD

The present study indicates substantial under-diagnosis of AAD in clinical practice. Of all patients with an AAD diagnosis, only 29% of

those who committed suicide and 23% of our controls had been thus diagnosed by clinicians before this study. In particular, identification of AAD was rare in female suicide cases: before the present study, only one in 22 had received the clinical diagnosis of AAD.

Several factors may explain the low proportion of referrals to psychiatrists or GPs for alcohol misuse. One may be denial of alcohol problems in society in general; another may be the lack of treatment options for alcoholics. However, GPs' poor knowledge of how to diagnose alcohol misuse in their patients cannot be excluded. Thus, training of GPs and other clinicians in recognition and treatment of AAD is an essential means of suicide prevention among the population.

### Prevention of alcohol dependence as a suicide preventive measure

In many cases, AAD is associated with a variety of individual or family problems relating to people's social situation. Our present findings, as well as in previous studies, indicate that an appropriate state alcohol policy, an enhanced public awareness that alcohol misuse is treatable, and an increased competence among clinicians in diagnosing AAD may be crucial means of suicide prevention (Wasserman, 2001).

Our previous studies have, moreover, demonstrated similar suicide rates and trends in the Slavic (Russia, Ukraine and Byelorussia) and Baltic (Estonia, Latvia, Lithuania) republics of the former USSR, all of which have undergone similar socio-political changes (Wasserman *et al.* 1994, 1998*b*; Värnik *et al.* 1998). The present study also shows similar patterns of alcohol use for Estonians and Slavs (mainly Russians). This supports generalization of our finding that alcohol dependence is a suicide-risk factor in the aforesaid countries (Wasserman *et al.* 1998*b*). Evidently, a restrictive alcohol policy can serve as a means of reducing suicide in countries where rates of suicide and alcohol consumption are both high.

Owing to the complexity of factors leading to suicide, further studies are needed to elucidate the role of lethal alcohol poisoning, adverse life events and social conditions experienced by people who committed suicide. The same applies to the bearing of ethnicity on the effectiveness of suicide prevention and treatment.

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### DECLARATION OF INTEREST

None.

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