Cigarette smoking, alcohol intoxication and major depressive episode in a representative population sample

J Hämäläinen, J Kaprio, E Isometsä, M Heikkinen, K Poikolainen, S Lindeman, H Aro

Abstract

Objective—This study investigated the associations of cigarette smoking and alcohol intoxication with major depressive episode.

Design—Major depressive episode during the past 12 months was assessed in a national representative cross-sectional study using the Short Form of the University of Michigan version of the Composite International Diagnostic Interview (the UM-CIDI Short Form).

Subjects—A random sample of 5993 non-institutionalised Finnish people aged 15–75 years was interviewed as part of the 1996 Finnish Health Care Survey.

Results—In logistic regression models the factors associated with major depressive episode in the past 12 months were smoking 10 or more cigarettes daily (odds ratio (OR) 2.26; 95% confidence intervals (95% CI) 1.68, 3.04) and alcohol intoxication at least once a week (OR 2.99; 95% CI 1.70, 5.25). Their effects were independent of each other, and remained significant even after adjusting for other major risk factors (marital status, education, unemployment and chronic diseases). The attributable proportion (a measure of the impact of the risk factors of the disease on the population) for daily smoking of 10 or more cigarettes was 0.15, and for alcohol intoxication at least once a week 0.04.

Conclusion—Cigarette smoking and alcohol intoxication seem to be important risk factors for major depressive episode. In this population the impact of smoking was greater.

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Recent epidemiological studies have reported an association between smoking and major depression.1–4 This confirms earlier findings from clinical samples5,6 and studies linking smoking to depressive symptoms,7,8 although some exceptions have been noted.9,10 However, the extent to which smoking initiation precedes the onset of depression, and vice versa, remains to be fully resolved.11

The comorbidity between depression and alcoholism has been well documented: there is approximately 1.5-fold to 2.0-fold risk of depression among alcoholics compared with non-alcoholics in major community-based epidemiological surveys.12 In addition, this comorbidity is more common in women than men and order of onset also seems to be gender related: the multisite Epidemiological Catchment Area Study showed that alcoholism preceded the onset of major depressive episode in the majority of male cases (78%), while in women depression was usually antecedent (66% of cases).13

Although cigarette smoking and alcohol consumption may both start with the desire to change moods positively, dysfunctional long term mental health consequences are probable.14 Alcohol consumption and alcoholism are strongly associated with cigarette smoking.15,16 Little is known of the overall relation between smoking, alcohol consumption and major depression. In a recent study17 the association between cigarette smoking and major depression persisted after both alcoholism and anxiety disorders were controlled for. Within the Finnish Health Care Survey we investigated the prevalence of DSM-III-R major depressive episode in the previous 12 months, finding it to be 9.3% (men 7.2%, women 10.9%).18 We also found frequency of smoking and alcohol intoxication to be individually important risk factors for major depressive episode.19 The purpose of this study was to define which levels of smoking and alcohol use associate with major depressive episode, and if the effects of alcohol use and smoking on risk of depression are independent of each other, and of other risk factors.

Methods

This study forms part of a recent nationwide Finnish Health Care Survey (FHCS).20 The basic target population comprised all resident household dwellers of Finland in 1996. Institutionalised persons (about 63 000) were excluded, leaving a final target population of some 5 million people. The sampling design was one stage cluster sampling in which households formed the clusters. The households were constructed by first drawing a random sample of index persons from the population register. The members of the household of each index person were identified from the population register via the address. All household members aged 15 and over were interviewed personally between 5 April and 21 June by professional interviewers employed by Statistics Finland and trained in the use of the UM-CIDI Short Form (see below).

The data were collected by the Computer Assisted Personal Interview (CAPI) technique.19 To assess depression, 24 structured items from the Short Form of the UM-CIDI were used to generate a probability diagnosis of
Both cigarette smoking and alcohol intoxication are associated with major depressive episode independently of each other.

### Table 1

Sex and age adjusted odds ratios for the presence of major depressive episode by cigarette smoking and alcohol intoxication

<table>
<thead>
<tr>
<th>Smoking status</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>1.00 (1.00, 1.00)</td>
</tr>
<tr>
<td>Former</td>
<td>1.00 (0.95, 1.05)</td>
</tr>
<tr>
<td>Irregular</td>
<td>1.00 (0.95, 1.05)</td>
</tr>
<tr>
<td>1–9 cigarettes per day</td>
<td>1.00 (1.00, 1.00)</td>
</tr>
<tr>
<td>≥10 cigarettes per day</td>
<td>1.00 (1.00, 1.00)</td>
</tr>
<tr>
<td>Alcohol intoxication</td>
<td></td>
</tr>
<tr>
<td>Abstainer</td>
<td>1.00 (1.00, 1.00)</td>
</tr>
<tr>
<td>Never</td>
<td>1.00 (1.00, 1.00)</td>
</tr>
<tr>
<td>&lt;1 time/month</td>
<td>1.00 (0.99, 1.01)</td>
</tr>
<tr>
<td>2–3 times/month</td>
<td>1.00 (0.99, 1.01)</td>
</tr>
<tr>
<td>≥1 time/week</td>
<td>1.00 (1.00, 1.00)</td>
</tr>
</tbody>
</table>

### Table 2

Odds ratios for the presence of major depressive episode by selected demographic and lifestyle characteristics, logistic regression model

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking ≥20 cigarettes per day</td>
<td>1.85 (1.33, 2.58)</td>
</tr>
<tr>
<td>Smoking ≥10 cigarettes per day</td>
<td>2.26 (1.68, 3.04)</td>
</tr>
<tr>
<td>Alcohol intoxication ≥1 time/week</td>
<td>2.99 (1.70, 5.32)</td>
</tr>
<tr>
<td>Age</td>
<td>1.00 (0.99, 1.01)</td>
</tr>
<tr>
<td>Sex, female</td>
<td>2.09 (1.71, 2.55)</td>
</tr>
<tr>
<td>Disability pension</td>
<td>2.34 (1.62, 3.38)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>1.78 (1.38, 2.29)</td>
</tr>
<tr>
<td>Chronic medical conditions 1–2</td>
<td>1.47 (1.18, 1.82)</td>
</tr>
<tr>
<td>Chronic medical conditions &gt;2</td>
<td>2.49 (1.85, 3.34)</td>
</tr>
</tbody>
</table>
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association between smoking and MDD,24 and dependence. In earlier studies with adults, the had unipolar major depression and most of the 77% of subjects with major depressive episode

cultural biases in the validity of UM-CIDI has arisen. Our prevalence estimate for major depressive episode was convergent with most other general population studies.19 Our instrument did not generate diagnoses of specific mood disorders but only of major depressive episode. It is probable that most of the people with a major depressive episode had unipolar major depression. For comparison, in the Epidemiological Catchment Area (ECA) study25 77% of subjects with major depressive episode had unipolar major depression and most of the remainder were suffering from bipolar disorders or bereavement. We also lacked diagnostic level information on substance abuse or dependence. In earlier studies with adults, the association between smoking and MDD,26 and (mild or moderate) nicotine dependence and MDD,27 remained significant even after controlling for other psychiatric disorders.

These cross sectional data can only suggest, not prove, causal relations. The strong association of cigarette smoking with major depression indicates that smoking may be an important risk factor both on the individual and population level. It has been suggested that causes of major depression may include both genetic and environmental factors.24 There may be separate specific causal mechanisms from smoking to major depression, and vice versa. It is also possible that smoking may be a marker of a variety of genetic, personal, social and familial properties.25 Thus, resolution of causality even in longitudinal studies is not a simple issue.

However nicotine, the pharmacologically active component of cigarette smoke, is known to have direct and indirect effects on the neurotransmitters thought to be involved in major depression.27 There is speculation of a specific relation between smoking and major depression only in smokers who are nicotine dependent.28 This hypothesis is suggested by findings indicating that increased rates of major depression are found only among nicotine dependent smokers and not non-dependent smokers. Our findings suggest a relation between the prevalence of major depressive episode and the consumption of cigarettes: current smoking over 10 cigarettes per day was significantly associated with major depressive episode. The increased association for those smoking under 10 cigarettes per day or for irregular smokers was less consistent. Among former smokers, the prevalence of major depression was increased only in women.

The increased incidence of alcoholism among smokers29 may be partially responsible for the relation observed between smoking and depression, although some such findings have been independent of alcohol intake.24 25 Factors such as education may also exert a role—lower educational attainment is often associated with a greater prevalence of smoking26 28 and has been implicated in failure to stop.29 30 Other suggested confounding factors between smoking and depression include age,31 obesity,32 and sex, with many studies showing a stronger relation between smoking and depressive symptoms among women.33 35 In our model the other possible confounding factors were adjusted for one by one, after which only frequent alcohol intoxication (weekly or more often) and sex remained statistically significant in the final model. Neither educational attainment, obesity nor age had a statistically significant effect.

Most studies investigating the comorbidity between major depression and alcoholism have focused on diagnostic level information;36 37 few have assessed the nature of relations between depressive symptoms and problematic alcohol use.38

In conclusion, both cigarette smoking and alcohol intoxication seem to be important risk factors for major depressive episode. In our population the impact of smoking was greater.

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Conflicts of interest: none.

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