Nicotine dependence, use of illegal drugs and psychiatric morbidity

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Abstract

The purpose of this study was to examine the association of smoking and nicotine dependence with psychiatric morbidity, controlling for the potential confounding effect of smoking on the relationship between the use of other substances and psychiatric morbidity. A sample of 290 adults were interviewed at a primary health centre (patients, 58%; patients’ relatives, 34%; staff, 8%) to inquire about their tobacco, caffeine, alcohol, and illegal drug consumption. Psychiatric morbidity, defined by a score >6 on the General Health Questionnaire (GHQ-28), showed a strong direct association with nicotine dependence. The use of illegal drugs, but not of alcohol, was also strongly associated with psychiatric morbidity, after controlling for smoking. Both smoking and high nicotine dependence were also associated with use of caffeine, alcohol, cannabis and cocaine. High nicotine dependence may be considered as an expression of individual psychopathologic vulnerability. Tobacco may have a central facilitating role in the use of caffeine, alcohol, and illegal drug.

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1. Introduction

Co-morbidity between use, abuse or dependence of addictive substances (legal or illegal) and mental disorders has been well documented. In the general population, affective, anxiety and psychotic disorders are associated with both current tobacco use (Breslau, Novak, & Kessler, 2004; Degenhardt, Hall, & Lynskey, 2001a; Farrell et al., 2001) and nicotine dependence (Farrell et al., 2001; Schmitz, Kruse, & Kugler, 2003). The relationship between caffeine and anxiety or psychological distress has been observed in intervention studies (Brice & Smith, 2002; Dager et al., 1999), though a large population study (Eaton & McLeod, 1984) found no association between the consumption of coffee or tea and symptoms of anxiety. The co-morbidity between alcohol dependence and other psychiatric disorders is consistent across different studies: alcohol dependence co-occurs with psychotic, affective and anxiety disorders (Degenhardt et al., 2001a; Farrell et al., 2001; Kessler et al., 1997).

The association of illegal drug use or dependence with affective and anxiety disorders has been established in some studies (Agosti, Nunes, & Levin, 2002; Farrell et al., 2001) but not all (Degenhardt et al., 2001a). A 15-year follow-up study (Bovasso, 2001) has demonstrated that cannabis abuse is a risk factor for depression. Cannabis use increases the risk of psychosis in psychosis-free persons and may precipitate the development of psychosis in persons who are vulnerable to psychotic disorder (van Os et al., 2002). Cannabis dependence is associated with antisocial personality, conduct disorder (Agosti et al., 2002) and psychosis (Degenhardt et al., 2001a) in the general population.

Previous studies in the general population have shown that the consumption (use, abuse or dependence) of addictive substances are inter-related. Current tobacco use and nicotine dependence are associated with the use, abuse or dependence of both alcohol and illegal drugs (Degenhardt, Hall, & Lynskey, 2001b; Schmitz et al., 2003); and tobacco smoking is associated with caffeinated beverage consumption (de Leon et al., 2003). Alcohol dependence is strongly associated with use or dependence of cannabis (Agosti et al., 2002; Degenhardt et al., 2001b), nicotine dependence (John et al., 2003) and caffeine consumption (Amit, Weiss, Smith, & Markevitch, 2004). Cannabis use, abuse or dependence increases the likelihood of use of tobacco, alcohol, sedatives, stimulants and opiates, and the likelihood of dependence of all these four types of substances (Degenhardt et al., 2001b).

Since there is an association among the use of these substances, the aim of present study was to clarify the association of smoking and nicotine dependence with psychiatric morbidity, and to control for the potential confounding effect of smoking on the relationship between the use of other substances and psychiatric morbidity.

2. Methods

2.1. Subjects

The participants of this cross-sectional study were recruited at a primary health service in the city of Granada (southern Spain), during the time period between September 2002 and March 2003. The sample comprised 290 individuals of age 18 or over, including patients (58.3%), family members of patients (34.1%) and staff working in the service (7.6%); four additional subjects were excluded, one suffering from bipolar disorder and three from schizophrenia. The recruitment came to an end when 100
consecutive daily smokers participated, which represents a 34.5% prevalence, the same as the one found in the general population of Spain (Pinilla & González, 2001). The subjects were interviewed after they had read a detailed consent form and agreed to participate in this anonymous survey. Information was collected using a structured questionnaire that included information on the following data (in this order): (1) socio-demographic characteristics; (2) consumption of tobacco, alcohol, caffeine, and illegal drugs; and (3) psychiatric morbidity.

2.2. Instruments

A Spanish version (Lobo, Pérez-Echeverría, & Artal, 1986) of the 28-item version of the General Health Questionnaire (GHQ-28) (Goldberg & Hillier, 1979) was used to detect psychiatric morbidity. The subjects were defined as probable psychiatric “cases” when they scored >6; this cut-off line provides a sensitivity of 77–89% and a specificity of 86–90% (Goldberg et al., 1997; Lobo et al., 1986). The subjects were also asked whether they were suffering from any psychiatric disorder and whether they were using psychotropic medication (or had in the past).

In response to queries about their tobacco consumption, subjects were classified as never smokers, former smokers, and current smokers (in all three cases, daily smoking). The Fagerström test for Nicotine Dependence (FTND) (Heatherton, Kozlowski, Frecker, & Fagerström, 1991) was used to evaluate nicotine dependence. A FTND score of 6 or higher identifies subjects with high nicotine dependence (Fagerström et al., 1996). Participants were also asked about their weekly consumption of caffeineinated beverages (coffee, tea, cola). Average caffeine intake was determined by estimating caffeine content in the beverages and then converting it to mg/kg/day (Gurpegui, Aguilar, Martínez-Ortega, Diaz, & de Leon, 2004). A high amount of caffeine intake was defined as an intake greater than 200 mg of caffeine per day. The weekly consumption of alcoholic beverages (wine, beer, liquor) was determined though structured questions and then converted into g/kg/day. A high amount of alcohol intake was defined as consuming more than 30 g of alcohol per day for men and more than 20 g for women. Participants were also asked about any regular use of psychotropic medication and the weekly consumption of illegal drugs: cannabis (hashish or marihuana), opiates, cocaine, amphetamines, and ecstasy.

2.3. Statistical analysis

Bivariate analyses with Pearson’s chi-square (or Fisher’s exact) tests for 2 × 2 contingency tables were used to determine the associations of psychiatric morbidity (GHQ-28 > 6) with other variables. Pearson correlation coefficients between the amount of addictive substances consumed and the GHQ-28 score were also calculated. The relationships between psychiatric morbidity and the consumption or dependence of each substance, adjusting for sex and age, were evaluated by logistic regression models.

3. Results

Of 290 participants, 100 (34.5%) were current daily smokers; of these, 27 (27%) had high nicotine dependence (FTND ≥ 6); 204 (70.3%) were caffeine consumers and 55 (19%) were
exposed to a daily intake of more than 200 mg of caffeine; and 34 (11.7%) were weekly users of any illegal drug. Regarding alcohol, 28 (9.7%) were excessive drinkers and 144 (49.7%) were non-excessive drinkers. Psychiatric morbidity (GHQ-28 > 6) was detected in 84 (29%) of the 290 participants. Of the subjects with psychiatric morbidity, 32 (38.1%) affirmed to be suffering from any psychiatric disorder and 35 (41.6%) reported regular use of psychotropic medication. Male sex, marital status (separated or divorced), high nicotine dependence and consumption of any illegal drug were significantly associated with psychiatric morbidity. Table 1 shows the intercorrelation matrix of addictive substances, as well as their correlations with the GHQ-28 scores.

The logistic regression analyses showed that high nicotine dependence was associated with a higher risk of psychiatric morbidity and with the self-report of having received a diagnosis of psychiatric disorder (Table 2). Consumption of illegal drugs (cannabis or cocaine) significantly increased the risk of GHQ-detected psychiatric morbidity but not of self-reported disorders (Table 2).

4. Discussion

In the present study, high nicotine dependence and the consumption of illegal drugs (cannabis, cocaine) showed a significant association with the psychiatric morbidity. Moreover, we found associations for the use of different addictive substances among each other. Our study has some methodological limitations; its cross-sectional design limits the possibility of establishing a causal direction in the association of psychiatric morbidity with nicotine dependence or the use of illegal drugs; the information was collected by interview and there is always a chance of recall bias or underestimation in the self-reported consumption of substances.
4.1. Tobacco and psychiatric morbidity

In agreement with previous studies that find associations between nicotine dependence and psychiatric disorders in adults (Farrell et al., 2001; Schmitz et al., 2003), high nicotine dependence showed a significant association with both the GHQ-28 score and psychiatric morbidity (GHQ-28 ≥ 6), and with the self-report of any mental disorder (non-psychotic), even after controlling for sex and age. However, non-dependent smoking was not associated with psychiatric morbidity in our study, in coincidence with Schmitz et al.’s (2003) study in the general population of Germany. In contrast, Breslau et al. (2004) find a significant association of smoking with both depression and some anxiety disorders, but without a significant difference between dependent and non-dependent smokers. On the other hand, Farrell et al. (2001) find a significant association of nicotine dependence with psychiatric morbidity, but all their smokers were classified as nicotine-dependent, whereas Degenhardt et al. (2001a) find a significant association of smoking with both affective and anxiety disorders, but they do not measure nicotine dependence.

The fact that, in our sample, the variables current smoking and number of cigarettes smoked daily were not associated with psychiatric morbidity, whereas the variable high nicotine dependence was, shows the importance of evaluating nicotine dependence. Therefore, in smoking-cessation interventions the professionals should consider both nicotine dependence and the possible psychiatric morbidity of smokers when designing counseling educational and pharmacological treatments specifically tailored to their conditions.

### Table 2

Logistic regression of psychiatric morbidity with consumption of addictive substances

<table>
<thead>
<tr>
<th>Variables</th>
<th>Psychiatric disorder, self-reported</th>
<th>GHQ-28 ≥ 6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% Adjusted OR 95% CI</td>
<td>% Adjusted OR 95% CI</td>
</tr>
<tr>
<td>Smoking status&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>16.2 1.00 (ref.)</td>
<td>31.0 1.00 (ref.)</td>
</tr>
<tr>
<td>Former</td>
<td>16.1 1.00 (0.40–2.50)</td>
<td>21.3 0.70 (0.32–1.53)</td>
</tr>
<tr>
<td>Current</td>
<td>17.1 1.25 (0.51–2.66)</td>
<td>31.0 1.26 (0.71–2.25)</td>
</tr>
<tr>
<td>FTND (total score)&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>15.3 1.00 (ref.)</td>
<td>27.8 1.00 (ref.)</td>
</tr>
<tr>
<td>1–5</td>
<td>12.8 0.86 (0.34–2.21)</td>
<td>21.3 0.74 (0.34–1.59)</td>
</tr>
<tr>
<td>≥ 6</td>
<td>33.3 3.40 (1.36–8.52)</td>
<td>51.9 3.53 (1.51–8.25)</td>
</tr>
<tr>
<td>Alcohol (g/day)&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>18.6 1.00 (ref.)</td>
<td>28.8 1.00 (ref.)</td>
</tr>
<tr>
<td>1–10</td>
<td>14.8 0.91 (0.42–2.00)</td>
<td>29.5 1.16 (0.61–2.21)</td>
</tr>
<tr>
<td>11–20</td>
<td>17.4 1.03 (0.41–2.58)</td>
<td>30.4 1.42 (0.65–3.10)</td>
</tr>
<tr>
<td>21–30</td>
<td>11.1 0.62 (0.13–2.94)</td>
<td>27.8 1.16 (0.37–3.63)</td>
</tr>
<tr>
<td>&gt;30</td>
<td>15.0 0.92 (0.22–3.84)</td>
<td>25.0 1.35 (0.41–4.45)</td>
</tr>
<tr>
<td>Illegal drugs&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>16.0 1.00 (ref.)</td>
<td>26.2 1.00 (ref.)</td>
</tr>
<tr>
<td>Yes</td>
<td>20.6 1.90 (0.74–4.89)</td>
<td>50.0 4.00 (1.74–9.20)</td>
</tr>
</tbody>
</table>

<sup>a</sup> Adjusted OR for sex and age.

<sup>b</sup> Including nonsmokers.

<sup>c</sup> Adjusted OR for sex, age, and smoking.
4.2. Alcohol, caffeine and psychiatric morbidity

We found that the higher the alcohol intake the higher the GHQ-28 score. Yet in the logistic regression, when controlling for cigarette smoking, the association between alcohol intake and psychiatric morbidity waned. It seems that rather than levels of alcohol use per se, it is the abuse or dependence what is relevant for the association with psychopathology (Degenhardt et al., 2001a; Farrell et al., 2001; Kessler et al., 1997). The consumption of caffeine does not appear to be related with psychiatric morbidity, as is the case of the study by Eaton and McLeod (1984).

4.3. Illegal drugs and psychiatric morbidity

The use of any illicit drug was significantly associated with psychiatric morbidity, even after controlling by potential confounders such as sex, age, and smoking status, in accordance with previous studies that find an association of use of illegal drugs with non-psychotic mental disorders (Farrell et al., 1998, 2001). A noteworthy implication of this finding is that just the use of any of these illegal drugs may increase probability of suffering a mental disorder in initially disease-free-populations (van Os et al., 2002). In our sample, 34 subjects (11.7%) were users of illegal drugs, and half of them scored >6 on the GHQ-28.

4.4. Co-occurrence of use of legal and illegal addictive substances

In our study, the bivariate analyses (Table 1) showed a correlation of the amount of tobacco use (number of cigarettes smoked daily) and the level of nicotine dependence with the amount of alcohol consumption and the frequency of use of cannabis or cocaine, in accordance with previous studies (Degenhardt et al., 2001b; Schmitz et al., 2003). As expected, the number of cigarettes smoked daily and the level of nicotine dependence were associated with consumption of caffeine in agreement with previous observations (de Leon et al., 2003). Common genetic factors could explain, at least in part, the association between the use of tobacco, alcohol and caffeine (Hettema, Corey, & Kendler, 1999). In addition, simple use of cocaine showed significant correlation with both alcohol and cannabis use, which means that not only dependence co-occurs (Bierut et al., 1998).

In conclusion, high nicotine dependence may be considered as an expression of individual psychopathologic vulnerability; this association should be taken into account in smoking cessation interventions. In the case of illegal drugs, the use of any of them (without analyzing abuse or dependence) shows a strong association with psychiatric morbidity. Moreover, there is a general co-occurrence in the use of different substances, where tobacco may have a central facilitating role, since both smoking and high nicotine dependence are associated with the use of caffeine, alcohol, and illegal drugs.

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References


