Sex Differences in Smoking Prevalence and Characteristics Associated with Receptivity to Quitting in Psychiatric Patients

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Abstract

Background: Smoking rates are elevated in psychiatric samples in general, rendering smoking a significant concern in this population. Moreover, women with psychiatric illness may be more likely to smoke cigarettes than men, in contrast with the higher rate of smoking for men in the general population. To extend our understanding of smoking in individuals with psychiatric illness, we studied a sample of patients seeking treatment, most of whom suffered from Major Depressive Disorder (MDD), assessing smoking history and, among current smokers, willingness to be contacted about a smoking cessation program.

Methods. We conducted a retrospective study of 129 outpatients (88 women, 41 men). Seventy-eight percent of the sample was diagnosed as having MDD (53% with MDD only, 15% with comorbid MDD and anxiety disorder, and 10% with comorbid MDD and dysthymia). The remaining 22% were diagnosed with Generalized Anxiety Disorder, Panic Disorder, and a variety of other psychiatric disorders (fewer than 5% each).

Results: Overall, 33% of our sample were current smokers and 12% were ex-smokers. Current smokers had completed significantly fewer years of formal education than the never smokers. Smoking rate was elevated in female patients (34%) compared to
women in the community (16%), and to a lesser degree in male patients (29%) compared to men in the community (20%). Seventeen percent of men and 10% of women were former smokers (ns), suggesting that nearly half of all psychiatric patients may smoke at some time during their lives and yielding a low quit ratio (percent of ever smokers who have quit) of 28%. Thirty-three percent of current smokers were willing to be contacted about a smoking cessation program, not differing by sex. Among current smokers, those willing to be contacted about a smoking cessation program had smoked more years, were older, had a higher Heaviness of Smoking Index, and had expressed a greater desire to quit when compared to current smokers who were unwilling to be contacted about a smoking cessation program.

**Conclusions:** Smoking poses a significant health risk, and the increased prevalence of smoking in psychiatric samples, combined with a decreased likelihood of quitting, results in even greater risks among those with psychiatric illness. A third of women in our sample were current smokers, placing this population at particular risk. We encourage endeavors to better explain differential mechanisms underlying higher smoking rates in psychiatric samples, particularly in women, and to develop more specific tools for smoking cessation programs. On a promising note, about 33% of those who currently smoke were willing to be contacted about a smoking cessation program.

**Keywords:** smoking, cessation, depression, outpatient, sex

Smoking rates in psychiatric populations are two to four times as high as in the general population (Grant et al., 2004; Lasser et al., 2000). Evidence that the comorbidity of smoking and depression is stronger in women than in men has recently been reported (Husky, Mazure, Paliwal, and McKee, 2008). Furthermore, individuals suffering from psychiatric illness are less successful in quitting smoking than in quitting alcohol or other drugs (de Leon, Susce, et al, 2005). There is considerable evidence to suggest that smokers with depression or even a history of depression have greater difficulty than others in quitting (e.g., Glassman et al., 1988; Glassman, 1993; Balabanis et al., 2001), although findings to the contrary have also been reported (e.g., Hall et al., 1994; Ginsberg et al., 1995; Hitsman et al., 2003; El-Guebaly, et al., 2002; Hall et al., 2006). Similarly mixed evidence has been reported regarding abstinence-induced depression, with some studies supporting the existence of this phenomenon (e.g., Glassman et al., 1990; Covey, Glassman & Stetner, 1990; 1997; Pomerleau et al., 2001) and others not (e.g., Tsoh et al., 2000; Prochaska et al., 2008).

The explanation for the over-inclusion of smokers among psychiatric patients is unclear (Bonsack et al., 2001), though a number of mechanisms have been proposed, including self-medication (Kasuga et al., 1991), lowered $\mu$-opioid receptor density (Scott et al., 2007; Contet, Kieffer & Befort, 2004), reduction in brain levels of MAO-A and MAO-B (Fowler et al., 1996a; 1996b), and familial/genetic overlap (Kendler et al., 1993; Johnson, Rhee, Chase & Breslau, 2004; Kalman, Morissette & George, 2005). Alternatively, it has been proposed that smoking causes or increases vulnerability to depression (Breslau et al., 1998).

The tobacco standard of care (Fiore et al., 2000) stipulates that medical encounters should include asking about smoking, advising smokers to quit, and arranging for tobacco cessation treatment, yet this is rarely done in the context of psychiatric treatment (El-Guebaly...
et al., 2002; Haug et al., 2005; Lasser et al., 2000). Even addiction psychiatrists tend to concentrate on alcohol, illicit drugs, and prescription drugs first rather than on smoking. To the extent that psychiatrists do offer smoking cessation treatment, it tends to focus on a small minority of psychiatric patients, typically those classically at risk for cardiovascular disease, obesity, hypertension, or diabetes mellitus (Himelhoch & Daumit, 2003). Barriers to the implementation of such programs include lack of training in treatment modalities appropriate for co-occurring diagnosis of addiction and other mental illness, concerns that smoking cessation will compromise the success of psychiatric treatment, absence of integrated treatment programs, and insufficient integration between psychotherapy and psychopharmacological treatment (Williams & Ziedonis, 2004). Despite the fact that nicotine dependence is “officially” a psychiatric diagnosis, nicotine—in stark contrast to alcohol, illicit drugs, and abused prescription drugs—has minimal behavioral toxicity. On the contrary, nicotine delivered via inhaled tobacco smoke ameliorates psychiatric symptomatology and its absence exacerbates them in dependent smokers. Smoking-related diseases take many years to develop; thus, smoking cessation does not have the same immediacy as other substance abuse problems.

A recent study by Haug, Hall, Prochaska, and colleagues (2005) challenged the implicit assumption that current psychiatric patients are not appropriate candidates for smoking cessation treatment. Participants were 154 psychiatric outpatients in treatment for depression who were recruited to participate in a smoking study involving repeated contact with a counselor. Those who, after counseling, agreed to set a quit date and participate in a trial of behavioral counseling and bupropion as an aid in smoking cessation were classified as Acceptors (n=53; 34%); those who declined were classified as Refusers (n=101; 66%). Among Acceptors, the number of days to treatment acceptance was significantly predicted by stage of change, with those in preparation entering smoking cessation treatment more quickly than contemplators or precontemplators. Accepting treatment was associated with current use of psychiatric medication and perceived anticipation of successful quitting. Severity of depressive symptoms, duration of depression history, and history of recurrent depression were not related to treatment acceptance.

The goals of the current study were as follows: 1) to determine smoking prevalence of a consecutive sample of male and female outpatients seeking psychiatric treatment for depression and other mood disorders; 2) to determine whether male and female psychiatric patients who were current smokers differed with respect to demographic, clinical, and smoking related variables; and 3) to assess receptivity to a smoking cessation intervention among current smokers. Our sample, unlike that of Haug et al. (2005), consisted of all smokers seeking psychiatric treatment, rather than individuals recruited to participate in a trial and motivated by counseling and the promise of bupropion. Since mood disorders are approximately twice as common in women (APA, 1994), we were particularly interested in identifying sex differences that might have implications for addressing and overcoming barriers to smoking cessation in this population.
Methods

Participants

Smoking variables were assessed in 146 consecutive outpatients at their intake interviews at the University of Michigan Depression Center. Of these, 17 were missing demographic data and were excluded from subsequent analyses. Of the remaining 129, 88 (69%) were female and 86% Caucasian. Sixty-five percent were currently taking psychotropic medications. The majority (78%) suffered from Major Depressive Disorder (MDD), including 53% with MDD only, 15% with Comorbid Depression and Anxiety, and 10% with Comorbid Depression and Dysthymia. The remaining 22% were diagnosed with Generalized Anxiety Disorder, Panic Disorder, and a variety of other psychiatric disorders (fewer than 5% each).

Measures

A brief smoking history questionnaire was administered to determine smoking status and current/past use of other tobacco products. Smoking rate (cigarettes/day), desire to quit (rated on a scale of 1 [low] to 10 [high]), years smoked, and willingness to be approached about participating in a formal smoking cessation program were assessed in current smokers. Current smokers were also asked to complete the Fagerstrom Test for Nicotine Dependence (FTND; Heatherton, Kozlowski, Frecker & Fagerstrom, 1991), a brief self-report instrument extensively used in the field of nicotine and tobacco research (Chabrol, Niezborala, Chastan & de Leon, 2005; John et al., 2006; Piper, McCarthy & Baker, 2006; Weinberger et al., 2006). A score on the Heaviness of Smoking Index (HSI; Kozlowski et al, 1994), a 2-item subset of the FTND, was also derived. Former smokers were asked to indicate how many years they smoked and when they last smoked.

The Patient Health Questionnaire (PHQ; Kroenke, Spitzer & Williams, 2001; Spitzer, Kroenke & Williams, 1999) is a nine-item questionnaire used to assess the DSM-IV symptoms of depression. It has been successfully used by our group and others (Balestrieri et al., 2004; Bellantuono et al., 2002; Dwight-Johnson, Ell & Lee, 2005; Langenecker et al., 2007; Rizzo, Piccinelli, Mazzi, Bellantuono & Tansella, 2000). Eight of the nine items were administered prior to the intake session via voice recognition telephone. The self-harm item was removed as responses were not routinely monitored prior to the clinical intake session.

Procedure

Consecutive patients arriving for their first psychiatric appointment with a depression treatment team were included in the study. The Institutional Review Boards (IRB) approved the study protocol, where clinic data from patients were retrieved retrospectively and de-identified with an approved waiver of informed consent, consistent with the Declaration of Helsinki. After greeting the participant, an assistant explained that the project was designed to expand clinical data available for tailoring treatment options. The participant then...
completed three cognitive screening measures reported elsewhere (Langenecker et al., 2007), along with the measures described above.

Data Analysis

Exploratory demographic analyses comparing smokers, former smokers, and never smokers were conducted using multivariate analysis of variance for continuous variables and chi square with nominal variables. Analyses based upon sex used t-tests for continuous variables and chi square analyses for nominal variables. Finally, t-tests and chi square comparisons were made within the current smoker group based upon willingness vs. unwillingness to be contacted about a smoking cessation program.

Results

Sample Characteristics

Current smokers constituted 33% of the sample. They had a mean FTND score of 3.3 (2.2), smoked 12.9 (8.6) cigarettes/day, and had been smoking for a mean of 15.1 (10.9) years. Former smokers constituted 12% of the sample. They had quit a mean of 13.5 (15.3) years ago, at the mean age of 28.9 (7.0). Never smokers constituted 55% of the sample.

Demographic and clinical variables for current smokers, former smokers, and never smokers are shown in Table 1. There was a significant difference among groups in years of formal education, with the never-smokers having more years of formal education compared with current smokers. There were no differences in other sample statistics between current, ex-, and never smokers.

Smoking Prevalence by Sex

Smoking prevalence in our sample (33%) was nearly double that of the surrounding community (18%). Smoking prevalence in female patients (34%) did not differ significantly from that in male patients (29%). When population parameters were entered for smokers from the surrounding county (16% in women vs. 20% in men), however, the chi-square analysis was significant, with an interaction between sex, smoking status, and location of sample ($X^2 = 23.9$, $p< .0001$, WCPHD, 2000). The prevalence of smoking in the study sample, in comparison with smoking prevalence in the local catchment area, is shown in Figure 1.

The quit ratio (percent of eversmokers who have quit) was 23% in women and 37% in men (NS), yielding an overall quit ratio of 28%.
Table 1. Sample characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Current Smokers (n=42)</th>
<th>Former Smokers (n=16)</th>
<th>Never Smokers (n=71)</th>
<th>Statistics and p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>32.8 (11.2)</td>
<td>40.9 (13.9)</td>
<td>35.9 (10.8)</td>
<td>F = 2.07, p = .06</td>
</tr>
<tr>
<td>Education a</td>
<td>14.4 (2.8)</td>
<td>15.4 (2.3)</td>
<td>16.4 (2.6)</td>
<td>F = 7.27, p = .001</td>
</tr>
<tr>
<td>Sex (% female)</td>
<td>71.4%</td>
<td>56.3%</td>
<td>69.0%</td>
<td>X = 1.28, p = .53</td>
</tr>
<tr>
<td>Race (% White, n = 110)</td>
<td>81.6%</td>
<td>92.9%</td>
<td>87.9%</td>
<td>X = 3.17, p = .79</td>
</tr>
<tr>
<td>PHQ-8</td>
<td>14.4 (5.8)</td>
<td>12.2 (6.3)</td>
<td>13.5 (6.4)</td>
<td>F = 0.73, p = .48</td>
</tr>
<tr>
<td>Age of Onset Psychiatric Illness</td>
<td>21.2 (11.5)</td>
<td>25.4 (14.5)</td>
<td>23.2 (10.5)</td>
<td>F = 0.82, p = .44</td>
</tr>
<tr>
<td>% Taking Psychotropic Medications</td>
<td>64.3%</td>
<td>75.0%</td>
<td>63.4%</td>
<td>X = 0.80, p = .67</td>
</tr>
<tr>
<td>Number of Family Members with Depression</td>
<td>1.3 (1.4)</td>
<td>1.3 (1.8)</td>
<td>1.5 (1.4)</td>
<td>F = 0.27, p = .76</td>
</tr>
<tr>
<td>Number of Family Members with any Psychiatric Illness</td>
<td>2.5 (1.9)</td>
<td>2.3 (2.1)</td>
<td>2.4 (1.7)</td>
<td>F = 0.13, p = .88</td>
</tr>
</tbody>
</table>

*Current Smokers had fewer years of formal education compared to Never Smokers (p = .0001).

Figure 1. Smoking prevalence in the Study Sample vs. in the Local Population (County Public Health Department, Health Improvement Plan (HIP) survey, 2000).
Sex Comparisons in Currently Smoking Psychiatric Patients

Comparisons between male and female current smokers in demographic, clinical, and smoking-related variables are shown in Table 2. Despite the relatively higher rate of smoking in females with psychiatric illness, none of the demographic, clinical, and smoking variables differed between men and women.

Table 2. Comparisons between male and female current smokers in demographic, clinical, and smoking related variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Women (n = 30)</th>
<th>Men (n = 12)</th>
<th>Statistics and p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>32.2 (10.7)</td>
<td>34.7 (12.9)</td>
<td>t = 0.65, p = .52</td>
</tr>
<tr>
<td>Education</td>
<td>14.1 (2.5)</td>
<td>15.1 (3.6)</td>
<td>t = 0.98, p = .34</td>
</tr>
<tr>
<td>PHQ-8</td>
<td>14.3 (4.8)</td>
<td>14.7 (8.2)</td>
<td>t = 0.65, p = .52</td>
</tr>
<tr>
<td>Age of Onset Psychiatric Illness</td>
<td>20.4 (10.5)</td>
<td>22.8 (14.0)</td>
<td>t = 0.87, p = .37</td>
</tr>
<tr>
<td>% Taking Psychotropic Medications</td>
<td>70%</td>
<td>50%</td>
<td>X² = 1.49, p = .22</td>
</tr>
<tr>
<td>Number of Family Members with Depression</td>
<td>1.6 (1.4)</td>
<td>0.8 (1.1)</td>
<td>t = -1.79, p = .08</td>
</tr>
<tr>
<td>Number of Family Members with any Psychiatric Illness</td>
<td>2.8 (1.9)</td>
<td>1.9 (1.8)</td>
<td>t = -1.35, p = .19</td>
</tr>
<tr>
<td>Age of Onset Smoking</td>
<td>18.7 (4.8)</td>
<td>17.2 (2.8)</td>
<td>t = -0.93, p = .36</td>
</tr>
<tr>
<td>Total Cigarettes Smoked per day</td>
<td>11.7 (9.1)</td>
<td>15.5 (7.1)</td>
<td>t = 1.29, p = .21</td>
</tr>
<tr>
<td>Total Years Smoked</td>
<td>13.5 (10.3)</td>
<td>19.6 (12.1)</td>
<td>t = 1.54, p = .13</td>
</tr>
<tr>
<td>Fagerstrom Total score</td>
<td>2.9 (2.3)</td>
<td>4.6 (1.7)</td>
<td>t = 1.78, p = .09</td>
</tr>
<tr>
<td>Heaviness of Smoking Index</td>
<td>1.8 (1.5)</td>
<td>2.7 (1.3)</td>
<td>t = 1.50, p = .14</td>
</tr>
<tr>
<td>Desire to Quit</td>
<td>5.2 (3.3)</td>
<td>6.2 (3.8)</td>
<td>t = 0.46, p = .98</td>
</tr>
</tbody>
</table>

Characteristics of Currently Smoking Psychiatric Patients Receptive to a Smoking Cessation Intervention

Percent of current smokers willing to be contacted about a smoking cessation program did not differ by sex, being 33% for both men and women. Table 3 shows characteristics of willing and unwilling groups of current smokers.

Current smokers willing to be contacted were significantly older, had smoked more years, scored higher on the HSI, and expressed a greater desire to quit smoking than those unwilling to be contacted.
Table 3. Characteristics of current smokers receptive to a smoking cessation intervention

<table>
<thead>
<tr>
<th>Variable</th>
<th>Willing (n = 14)</th>
<th>Unwilling (n = 28)</th>
<th>Statistics and p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>39.6 (11.8)</td>
<td>29.5 (9.4)</td>
<td>t = -3.02, p = .004</td>
</tr>
<tr>
<td>Education</td>
<td>14.9 (3.8)</td>
<td>14.2 (2.4)</td>
<td>t = -0.72, p = .47</td>
</tr>
<tr>
<td>Sex (% female)</td>
<td>71.4%</td>
<td>71.4%</td>
<td>X = 0.00, p = .99</td>
</tr>
<tr>
<td>Race (% White)</td>
<td>84.6%</td>
<td>80.0%</td>
<td>X = 2.02, p = .36</td>
</tr>
<tr>
<td>PHQ-8</td>
<td>15.6 (6.4)</td>
<td>13.8 (5.6)</td>
<td>t = -0.84, p = .41</td>
</tr>
<tr>
<td>Age of Onset Psychiatric Illness</td>
<td>24.5 (14.9)</td>
<td>19.5 (9.4)</td>
<td>t = -1.25, p = .22</td>
</tr>
<tr>
<td>% Taking Psychotropic Medications</td>
<td>64.3%</td>
<td>64.3%</td>
<td>X = 0.00, p = .99</td>
</tr>
<tr>
<td>Number of Family Members with Depression</td>
<td>1.2 (1.8)</td>
<td>1.4 (1.2)</td>
<td>t = 0.47, p = .64</td>
</tr>
<tr>
<td>Number of Family Members with any Psychiatric Illness</td>
<td>2.3 (2.2)</td>
<td>2.6 (1.7)</td>
<td>t = 0.40, p = .69</td>
</tr>
<tr>
<td>Age of Onset Smoking</td>
<td>17.5 (4.7)</td>
<td>18.7 (4.2)</td>
<td>t = 0.78, p = .44</td>
</tr>
<tr>
<td>Total Cigarettes Smoked per day</td>
<td>14.9 (6.3)</td>
<td>11.7 (9.6)</td>
<td>t = -1.13, p = .27</td>
</tr>
<tr>
<td>Fagerstrom Total score</td>
<td>3.9 (2.2)</td>
<td>2.9 (2.2)</td>
<td>t = -1.24, p = .23</td>
</tr>
<tr>
<td>Total Years Smoked</td>
<td>22.4 (11.8)</td>
<td>11.3 (8.5)</td>
<td>t = -3.33, p = .002</td>
</tr>
<tr>
<td>Heaviness of Smoking Index</td>
<td>2.7 (1.5)</td>
<td>1.6 (1.3)</td>
<td>t = -2.1, p = .04</td>
</tr>
<tr>
<td>Desire to Quit</td>
<td>7.9 (2.5)</td>
<td>3.9 (3.1)</td>
<td>t = -3.93, p = .001</td>
</tr>
</tbody>
</table>

Discussion

The smoking rate in the local community (18% in 2000)—probably because it includes several large post-secondary institutions—is lower than the national or state average. Similar to findings in other community samples, the smoking rate among psychiatric patients at intake was nearly double that in the local community (33%), an effect that was particularly pronounced in women (CDC, 2001, 2004). It was also substantially higher than the national rate of the general adult population (20.8%, CDC, 2006), a difference not accounted for by differences in education levels, which were nearly identical in both our sample and that of the community. While smoking rate was elevated in both men and women patients, it was disproportionately high in the women, in contrast to the pattern of higher prevalence for men in the general population. This finding provides support in a clinical sample for the findings of Husky et al. (2008) and is consistent with the possibility that women are more likely than men to use smoking for anxiety/mood modulation (Grant et al., 2004). Further research will be needed to explain and address the apparent excess of smoking among women in treatment for depression. Addressing factors in psychiatric patients that lead to higher rate of smoking, particularly in women, may also be helpful in developing smoking cessation programs tailored to the special needs of this population.
Smokers in our sample had a quit ratio of 28%. This quit ratio is about half that observed in the general population, which is 56% in Michigan and ranges from 43-59% (mean 44.8) depending upon state (CDC, 2004). Close to half the patients in our sample had been regular smokers at some time in their lives, similar to that in the general population (CDC, 2005). These findings suggest that excess smoking in psychiatric patients may be due to failure to quit rather than excess initiation. The quit ratio in our sample differed substantially between women and men (23% vs. 37%); although this difference did not reach significance in our small and largely female sample, further research is warranted to determine whether women psychiatric patients who smoke are less likely to quit than their male counterparts.

About a third of current smokers expressed willingness to participate in a smoking cessation program. This figure replicates, in a more naturalistic sample, the findings of Haug et al. (2005). The percentage was the same for both men and women, suggesting that women psychiatric patients are as willing as their male counterparts to consider smoking cessation treatment.

Regardless of sex, willingness to consider smoking cessation was particularly evident in patients who were older, had been smoking for significantly more years, scored higher on the Heaviness of Smoking Index, and smoked significantly more cigarettes per day. These characteristics are unsurprising and likely reflect recognition by these individuals that they are addicted to nicotine and have experienced some of the negative health effects of smoking. In contrast to the report of Haug et al. (2005), we found no association of medication status on willingness to consider smoking cessation treatment. There were also no main effects for symptoms of depression as measured by the PHQ-8.

Some caveats are in order. First, our sample was small and underpowered for detecting interaction effects based on sex. Second, it should be noted that these patients were not actually offered a smoking cessation program. Thus it is unclear if willingness to be contacted would translate into actual enrollment.

Nonetheless, our findings suggest that psychiatric programs should routinely screen for smoking, which is not typically done, and offer smoking cessation treatment to all smoking patients once clinical symptoms have been stabilized. Methods for motivating younger, lighter smokers (for whom cessation should be easier and success rates higher) to accept treatment should be developed and tested.

Most of what is known about response to smoking cessation treatment in individuals with a psychiatric diagnosis has been derived from secondary analyses of smoking cessation trials, comparing outcomes for smokers with depression or a history of depression with those of smokers without such a history (Gutmann, 2004; Hitsman et al., 2003; Munafo et al., 2008). A few studies have also studied smokers recruited for a history of depression or abstinence-induced depression (Glassman, Covey, Stetner & Rivelli, 2001; Kahler et al., 2003; Niaura et al., 1999; Niaura & Abrams, 2001; Pomerleau et al., 2003). Only a handful of reports have focused on patients actively in treatment for psychiatric illness—for example, Hall et al., 2006), who concluded that smoking cessation interventions used in the general population can be implemented in individuals in psychiatric treatment for depression. Others (e.g., Pomerleau et al., 2001; El-Guebaly et al., 2002) have suggested that currently depressed smokers might profit more from enhanced programs designed to address their special needs. Our study, combined with that of Haug et al. (2005), should help to dispel the myth that
psychiatric patients are “off limits” and open the doors for further research to resolve inconsistencies in the literature and optimize smoking cessation treatment in this population. Since smoking cessation trials in the general population have shown that women are more smoking-treatment-resistant than men (see Perkins, 2001, for a review of this issue), it will also be important to determine whether this trend extends to patients in concurrent treatment for psychiatric illness, and if so, to explore novel approaches to treating this particularly vulnerable population.

Acknowledgments

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Reference List


