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Original article

Cigarette smoking in obsessive-compulsive disorder and unaffected parents of OCD patients

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ABSTRACT

Background: Cigarette smoking is more prevalent among individuals with psychiatric disorders than the general population. Obsessive-compulsive disorder (OCD) may be an intriguing exception, although no recent study has investigated this hypothesis in OCD patients. Moreover, it is unknown whether reduced smoking rates are present in unaffected first-degree relatives of OCD patients.
Methods: We assessed smoking prevalence in adults with OCD and unaffected parents of youth with OCD (PYOCD). To this end, 113 adults with OCD completed online questionnaires assessing symptom severity and smoking status. Smoking status was obtained from an independent sample of 210 PYOCD assessed for psychiatric diagnoses.
Results: Smoking prevalence rates in adults with OCD (13.3%; $n = 15$) and PYOCD (9.5%; $n = 20$) samples were significantly lower than those found in representative samples of the general population (19–24%, all $P < .001$) and Axis I disorders (36–64%; all $P < .001$). There were no smokers in the adult OCD subset without clinically significant depressive symptoms ($n = 54$).
Conclusion: Low prevalence of smoking in OCD may be familial and unique among psychiatric disorders, and might represent a possible state-independent OCD marker. Hypotheses concerning the uncharacteristically low prevalence rates are discussed with relation to OCD phenomenology and pathophysiology.

1. Introduction

Cigarette smoking produces significant detrimental effects on general health and longevity. Smoking is associated with various types of cancer, diabetes, cardiovascular and respiratory diseases, and a general increase in mortality [64]. Annually, smoking causes between 5–6 million deaths worldwide [41]. Psychiatric disorders are considered major risk factors for cigarette smoking [3,21,48,81]. Indeed, 7% of the US population that meets criteria for both a psychiatric disorder and nicotine dependence consumes 34% of the cigarettes smoked in the US [35].

Epidemiological studies estimate that 19% of the adult general population (US [14]) smoke cigarettes. However, smoking rates are substantially higher among individuals with psychiatric disorders such as schizophrenia (62%–90% [3,18,20]), bipolar disorder (44%–69% [20,48]), depression (30%–60% [81]), and attention deficit/hyperactivity disorder (ADHD, 42% [47,67]). Taken together, 50%–80% of psychiatric patients in the US are daily smokers [78].

An intriguing exception to this rule may be obsessive-compulsive disorder (OCD), a prevalent (2.3% [70]) and debilitating disorder, which appears to be associated with low smoking rates [7,39]. Specifically, a small number of studies examining daily smoking in OCD subjects found significantly lower prevalence rates of smoking compared to rates reported in both general and psychiatric populations. In the first study to examine smoking in OCD, Bejerot and Humble [7] recorded the smoking status of 193 participants with OCD compared to 52 non-OCD psychiatric outpatients and a national normative sample in Sweden. The authors found that 14% of the OCD patients were current smokers, compared to 42% in the psychiatric outpatient group and 25% in the general population.

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Results from three additional studies are in support of this finding and reported smoking prevalence rates in OCD ranging from 5.5%–20% [6–8,54]. However, these studies did not address the potential mediating effect of depression and impulsivity, and provided little information regarding important aspects of smoking behaviors (e.g., level of nicotine dependence, and number of cigarettes per day). Moreover, the last two decades have been characterized by a consistent decline in smoking in the US population. The most recent report regarding smoking prevalence in a sample with OCD ($n = 39$) was published 9 years ago [6]. Furthermore, extrapolation from European prevalence data to the US is difficult due to trans-continental differences in cultures, attitudes towards smoking, and anti-smoking campaigns.

Thus, the first goal of the current study was to evaluate smoking rates in a current US cohort while addressing the limitations of previous research in this area. In light of prior hypotheses that nicotine might exacerbate an already hyperactivated frontal cortex and worsen OCD symptoms [7], we expected lower prevalence rates of cigarette smoking in OCD patients compared to psychiatric cohorts and large normative samples of the general population, as well as lower levels of nicotine dependence, fewer cigarette smoked per day, and fewer heavy smokers in our OCD sample. Moreover, in light of ample evidence regarding the association between depressive disorders and smoking [48], as well as evidence of the mediating role of depressive symptomatology in smoking onset and escalation [42], we expected to find a positive association between depression and depressive severity and smoking in OCD. That is, we hypothesized higher prevalence of smoking among depressed OCD patients compared to non-depressed OCD patients as well as among OCD patients with clinical levels of depressive symptoms compared to patients with subclinical levels of depressive severity (regardless of the presence of depressive disorder). Finally, in considering evidence that cigarette smoking is strongly associated with impulsivity [26], we hypothesized that OCD smokers will be more impulsive than OCD non-smokers.

A second goal of the current study was to investigate whether reduced smoking rates might extend to unaffected first-degree relatives of individuals with OCD and thus represent a familial characteristic of OCD. Prior evidence suggests that risk for cigarette smoking may be familial [9], and the familial transmission is likely influenced by a combination of genetic and environmental factors [5,19,43]. Results from familial risk studies suggest that OCD is a familial disorder [30,61]. Furthermore, results from imaging studies suggest that unaffected first-degree relatives of OCD patients share some frontostriatal functional abnormalities [16,17], abnormal error-related brain activity [69], and white matter abnormalities [55]. Based on suggestions that smoking may exacerbate OCD pathology via nicotine effects on an putatively hyperactive frontal cortex [7], and evidence for shared neurobiological abnormalities in unaffected first-degree relatives of OCD patients, we hypothesized that unaffected parents of OCD probands would also show lower prevalence rates of smoking compared to the general population.

2. Subjects and methods

2.1. Recruitment

Recruitment for the OCD sample consisted of four cohorts; the first cohort included 25 participants with a verified diagnosis of OCD who had previously participated in research studies [e.g., 56] or received treatment at the Massachusetts General Hospital OCD and Related Disorders Program. The second cohort consisted of 22 individuals who had sought treatment and consented to be contacted directly for research. The third cohort consisted of 42 participants who responded to an online advertisement on an OCD forum, and the final cohort included 24 participants who responded to advertisements posted on the hospital, program, and the International Obsessive-Compulsive Foundation (IOCDF) web page.

Parents of youth with OCD were recruited as part of an OCD family study via referral to the Pediatric OCD Program at McLean Hospital in Belmont, Massachusetts. Detailed recruitment and study methodology is reported elsewhere [31]. In brief, as part of a large pediatric OCD family study, 130 probands and 374 first-degree relatives were recruited mostly via referrals to a pediatric OCD program (22 families were ascertained directly through advertising). No ethnic or racial group was excluded from this study. Families were excluded if probands had a diagnosis of autism or pervasive developmental disorder, or a major sensorimotor handicap (e.g., deafness, blindness) or if they were not adequately fluent in the English language.

2.2. Web-based screening and assessment tool

All data for the OCD sample were collected using REDCap, a secure, web-based survey platform. Upon receiving a link to the study with relevant information and signing an online consent form, participants learned of the compensation for completing the survey (a $10 gift card). Participants then attested that they were at least 18 years of age, that they were previously diagnosed with OCD by a licensed mental health professional (i.e., psychiatrist or psychologist), and affirmed their English proficiency. To determine eligibility, participants completed a DSM-IV-based diagnostic questionnaire for OCD preceded by the statement: "The next short section will assess your eligibility to participate in this study and complete this survey." After entering their initials, eligible participants were redirected to complete the survey, which took 20–40 minutes, depending on the optional measures that appeared for participants who endorsed current, past, or no smoking behaviors.

2.3. Participants

The respective Institutional Review Boards (i.e., Massachusetts General Hospital and McLean Hospital) approved all measures and procedures. The adult OCD survey registered 156 complete entries, and we identified 16 suspicious entries (determined by either incongruent content responses across measures, similar email addresses, and/or reports regarding the referral source that did not match the recruiting cohort), which were subsequently excluded. Participants were included if they were aged 18 or older, proficient in English, and diagnosed with primary OCD. Exclusion criteria included: OCD not being the primary disorder, comorbid diagnosis of ADHD, bipolar disorder, autism, tic disorders, PTSD, anorexia, schizophrenia and bulimia nervosa. These disorders were selected as exclusion criteria in order to decrease the probability of inflated prevalence rates due to known disorder-specific high risk for smoking (e.g., bipolar disorder) and/or anhedonia (e.g., schizophrenia). To probe for comorbid disorders, participants read a brief description of major DSM-IV disorders and answered four multiple-response questions (i.e., "Based on these descriptions, please check any of the disorders you... are likely to have"; "have you ever in your lifetime been diagnosed with one of the following disorders by a psychologist or psychiatrist?") Next, participants selected the disorder that caused the most distress and significant interference with daily functioning. These items included the option to select "other" and specify in an open-ended text box. Using the information provided from items concerning psychiatric diagnoses and comorbidities (i.e., "have you ever in your lifetime been diagnosed with one of the following by a psychologist or psychiatrist?"), we excluded participants ($n = 27$) with a