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ORIGINAL ARTICLE

The epidemiology of obsessive-compulsive disorder in the National Comorbidity Survey Replication

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Despite significant advances in the study of obsessive-compulsive disorder (OCD), important questions remain about the disorder's public health significance, appropriate diagnostic classification, and clinical heterogeneity. These issues were explored using data from the National Comorbidity Survey Replication, a nationally representative survey of US adults. A subsample of 2073 respondents was assessed for lifetime *Diagnostic and Statistical Manual of Mental Disorders*, 4th edn (DSM-IV) OCD. More than one quarter of respondents reported experiencing obsessions or compulsions at some time in their lives. While conditional probability of OCD was strongly associated with the number of obsessions and compulsions reported, only small proportions of respondents met full DSM-IV criteria for lifetime (2.3%) or 12-month (1.2%) OCD. OCD is associated with substantial comorbidity, not only with anxiety and mood disorders but also with impulse-control and substance use disorders. Severity of OCD, assessed by an adapted version of the Yale–Brown Obsessive Compulsive Scale, is associated with poor insight, high comorbidity, high role impairment, and high probability of seeking treatment. The high prevalence of subthreshold OCD symptoms may help explain past inconsistencies in prevalence estimates across surveys and suggests that the public health burden of OCD may be greater than its low prevalence implies. Evidence of a preponderance of early onset cases in men, high comorbidity with a wide range of disorders, and reliable associations between disorder severity and key outcomes may have implications for how OCD is classified in DSM-V.
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Introduction

Systematic research on obsessive-compulsive disorder (OCD) beginning in the early 1980s was encouraged by the development of reliable diagnostic criteria,[1] clinical evidence of the seriously impairing nature of OCD,[2] and early suggestions that OCD responded both to the serotonergic tricyclic antidepressant clomipramine[3] and to behavior therapy.[4] Since that time, important advances have led to improved understanding of the disorder. The development of standardized symptom severity ratings[5,6] has helped to document the clinical phenomenology of OCD.[2,7] Research on psychobiological correlates[8,9] has demonstrated that OCD is associated with abnormalities within cortico–striatal–thalamic circuitry.[10] Epidemiological surveys have borne out clinical observations that OCD may be a particularly disabling medical disorder[11] with a significant negative impact on public health.[11,12] These advances have led to more sophisticated models of pathogenesis and have the potential to inform the development of more effective pharmacotherapies and psychotherapies.[9,13] Nevertheless, several important questions remain about the nature and impact of OCD.

First, in contrast to the extensive clinical literature on OCD, the prevalence of OCD in the community is not well understood. Prevalence estimates have varied considerably across surveys,[14] perhaps in part reflecting limitations in methodology and inconsistencies between lay and clinical diagnosis.[15] Prevalence estimates also have typically been reported only for the full syndrome, despite the need for information about the prevalence of subsyndromal obsessions and compulsions to inform decisions about the location of the diagnostic threshold.

Second, although much is known about the impact of OCD severity in the clinic, community surveys have not provided detailed data on clinical severity. The failure to consider severity hampers efforts to compare results across clinical and community studies and may partially account for discrepancies

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in the estimated disability associated with OCD in different studies.[12,16] To better understand the public health consequences of OCD, there is a need not only to collect more rigorous and detailed information about the impact of OCD on functioning, but to relate information about disability and prevalence to information about severity. Data are also needed on the implications of clinical severity for illness course, psychiatric comorbidity, and the probability of seeking treatment.

Third, there is strong disagreement over how best to classify OCD. There is growing interest in the heterogeneity of OCD,[17,18] with some evidence emerging for the validity of putative OCD subtypes such as early onset OCD[19,20] and OCD with poor insight.[21,22] There is also growing debate over whether OCD should remain an anxiety disorder in DSM-V or be classified with other compulsive and impulsive conditions[23,24] that have been suggested by some authors to fall along an OCD spectrum.[25,26] Although questions about psychobiological heterogeneity and spectrum relationships ultimately need to be addressed by methods such as those of behavioral genetics, current discussions would benefit from descriptive information about the features of OCD in the community and about the relationship of OCD to a range of other recognized diagnostic syndromes, including disorders involving difficulties with impulse control that have not routinely been included in community epidemiological surveys.

To permit exploration of these issues, an evaluation of OCD was included in the National Comorbidity Survey Replication (NCS-R), the most recent large-scale nationally representative epidemiological survey of the US household population. In contrast to the earlier NCS, which did not include OCD, the NCS-R assessed lifetime experiences not only of OCD but also of nine types of obsessions and compulsions (O/C) that are commonly reported by those with the disorder. Information about severity, onset, and insight was collected to allow examination of putative OCD subtypes. A structured version of the Yale–Brown Obsessive Compulsive Scale (Y-BOCS)[5,6] was also included to assess the severity of OCD in the community. Finally, the NCS-R assessments of comorbidity, impairment, and treatment allowed for a more comprehensive evaluation of the epidemiology of OCD than in many prior studies.

Materials and methods

Sample

The NCS-R is a nationally representative survey of adults ages 18 or older residing in English-speaking households in the coterminous United States. Face-to-face interviews were administered by professional survey interviewers to 9282 respondents between February 2001 and December 2003. The response rate was 70.9%. An initial recruitment letter and study fact brochure were followed by a home visit from an interviewer, who described the study and obtained verbal informed consent in line with procedures of the baseline NCS.[27] Respondents received $50 for participating in the survey.

The NCS-R interview contained two parts. Part I, the core diagnostic assessment, was administered to all respondents. Part II, which assessed additional disorders and correlates, was administered to a probability subsample of 5692 Part I respondents that included all those with any lifetime Part I diagnosis plus a probability subsample of all other Part I respondents.

Owing to the complexity of the OCD criteria and consequently lengthy OCD diagnostic section, OCD was assessed only in a random 30% of the Part II sample ($n = 2073$). As detailed elsewhere,[28] the Part I sample was weighted to adjust for differential probability of selection and for residual geographic and sociodemographic variation between the sample and the US population. The Part II sample was weighted to adjust for the oversampling of Part I cases so as to make the Part II sample nationally representative. The OCD subsample of the Part II sample was additionally weighted to adjust for minor discrepancies between it and the full weighted Part II sample. As such, the OCD subsample can be treated as providing nationally representative data on the community prevalence and correlates of OCD.

Obsessions, compulsions, and OCD

OCD was assessed by Version 3.0 of the World Health Organization Composite International Diagnostic Interview (CIDI 3.0),[29] a fully structured lay-administered interview. The OCD section assessed lifetime experiences of nine types of O/C that were present most days for at least 2 weeks at some time in the respondent's life. Respondents endorsing one or more of the O/C types were asked about time spent on obsessions (defined as *unpleasant thoughts, images, or impulses*) and compulsions (defined as *repeated behaviors or repeated mental acts that you felt compelled to do*). Separate series of questions assessed any reported obsessions, then compulsions, for all other diagnostic criteria of OCD. DSM-IV general medical and substance-related exclusions, but not diagnostic hierarchy rules, were applied in making diagnoses.

After the survey was fielded, a skip logic error was detected which terminated the OCD assessment prematurely for some respondents before OCD had been ruled out. To adjust for this error and enhance the accuracy of estimates, a clinical reappraisal study was conducted. Clinical interviewers recontacted a systematic subset of respondents by phone and administered the OCD module of the Structured Clinical Interview for DSM-IV (SCID)[30] as well as the OCD section of the CIDI with the problematic skips removed. Respondents received $50 for participating in this clinical reappraisal study. A total of 31 respondents were re-interviewed in this way, including 17 of 58 respondents who previously received a

DSM-IV/CIDI OCD diagnosis and 14 of 60 respondents who previously reported some OCD symptoms on the CIDI but were skipped out before all diagnostic criteria were assessed. Respondents who screened out of the CIDI OCD section before the problematic skips were assumed to be true negatives based on the realization that obtaining a reliable estimate of false negatives would require hundreds of additional interviews due to the low prevalence of OCD in the population. Bearing in mind this assumption, DSM-IV/CIDI OCD diagnoses were found to have excellent individual-level concordance with SCID diagnoses, with an area under the receiver operating characteristic curve of 0.95 and κ (standard error, s.e.) of 0.90 (0.03). Sensitivity was 90.2 and specificity was 99.7, for a total classification accuracy of 99.5. The estimated prevalence of DSM-IV OCD was the same whether the disorder was diagnosed by the CIDI or the SCID (McNemar $\chi^2_1 = 0.0$, $P = 0.893$). Regression-based imputation estimated from cases in the clinical reappraisal sample was used to impute diagnoses to those respondents who were involved in the CIDI skip logic error and were not re-interviewed.

Course, severity, and impairment

Respondents who met DSM-IV/CIDI lifetime criteria for OCD were asked about their age when they experienced the first obsession or compulsion and their age when they most recently experienced obsessions or compulsions most days for at least 2 weeks. Respondents reporting obsessions or compulsions in the 12 months before the interview also were asked to estimate the number of weeks in the past 12 months in which obsessions or compulsions were experienced most days and the average number of hours per day occupied by obsessions or compulsions. Clinical severity of 12-month cases was assessed using a fully structured version of the Y-BOCS that was adapted for use in the NCS-R (question wording appears at www.hcp.med.harvard.edu/ncs). The clinician-administered Y-BOCS is the clinical standard for assessing the severity of OCD and has good reliability and validity for this purpose.[5,6] As several respondents reported either obsessions without compulsions or compulsions without obsessions and consequently were administered only half of the Y-BOCS, severity scores were calculated by taking the higher of the Y-BOCS obsessions and compulsions subscale scores, then doubling this score to put the score into the standard Y-BOCS metric familiar to researchers and clinicians. We chose this approach based on research showing that (1) with good clinical probing, obsessions and compulsions almost always coexist, and (2) severity scores on the Y-BOCS obsessions and compulsions subscales tend to be similar.[31] As the maximum Y-BOCS total score is 40 and several treatment studies have required a score of 20 for inclusion, corresponding Y-BOCS cut points were used to define mild (< 20), moderate (20–29), and severe ($30+$) 12-month OCD cases.

Functional impairment was assessed in two ways for 12-month OCD cases. First, the Sheehan Disability Scales (SDS)[32] assessed the degree to which obsessions and compulsions interfered with home management, work, close relationships, and social life in the month during the past year when OCD was reported to be most severe. Each domain was rated on a 0–10 visual analog scale with response options of none (0), mild (1–3), moderate (4–6), severe (7–9), and very severe (10). In each domain, responses were collapsed into the categories of severe (7–10), severe or moderate (4–10), and any (1–10) impairment for analysis. The same categories were used to examine the highest score across all four domains. Second, impairment was assessed by asking respondents to estimate the number of days in the past 12 months during which they were 'totally unable' to work or carry out normal activities because of their OCD.

Comorbid DSM-IV disorders

CIDI 3.0 was used to assess a range of other DSM-IV anxiety, mood, impulse-control, and substance use disorders. DSM-IV organic exclusion and diagnostic hierarchy rules were used in diagnosing these disorders. As described elsewhere,[33] blinded clinical re-interviews using the SCID have found generally good concordance between SCID and CIDI diagnoses of DSM-IV anxiety, mood, and substance use disorders. Validation data are not available for diagnoses of impulse-control disorders because gold standard clinical assessments for these disorders were not available in the SCID at the time of the NCS-R clinical reappraisal studies.

Other correlates

Two other sets of correlates were examined in relation to OCD: sociodemographic characteristics and treatment. Sociodemographics included two types of variables: time-varying (age, education, marital status, parenting status) and time-invariant (sex, race-ethnicity). Lifetime and 12-month treatment included services for mental health problems received in any of four sectors: general medical, mental health specialty, human services, and complementary-alternative. Overnight hospitalization for OCD was also assessed for all lifetime cases.

Statistical analysis

Cross-tabulations were used to estimate the prevalence of OCD and the nine O/C types. Age-of-onset distributions were estimated separately for males and females with OCD using the actuarial method.[34] Associations of OCD with comorbid disorders and with sociodemographic variables were estimated first using logistic regression, then using discrete-time survival analysis[35] with person-year as the unit of analysis to examine earlier occurring variables as predictors of subsequent OCD onset. The temporal order of OCD and other variables was determined from retrospective age-of-onset reports. Logistic regression and survival coefficients were transformed

to odds ratios (ORs) with 95% confidence intervals (CIs) for ease of interpretation. Cross-tabulations and means were used to examine impairment for all 12-month cases and for subgroups of moderate and severe cases defined by the Y-BOCS. Cross-tabulations also were used to examine patterns of treatment. To adjust for weighting and clustering in the NCS-R sample design, all analyses used the Taylor series linearization method[35] implemented in the SUDAAN software system.[36] Multivariate significance was evaluated using Wald χ^2 tests based on design-corrected coefficient variance–covariance matrices. Statistical significance was evaluated at the 0.05 level using two-sided tests.

Results

Prevalence

Lifetime and 12-month prevalence estimates for DSM-IV OCD (s.e. in parentheses) are 2.3% (0.3) and 1.2% (0.3), respectively. In contrast, fully 28.2% of respondents reported experiencing obsessions or compulsions (O/C) at some time in their lives (Table 1). Most of these respondents experienced just one of the nine O/C types considered here, most commonly checking (15.4%), hoarding (14.4%), or ordering (9.1%).

Rarer O/C types are associated with a higher risk of OCD. Conditional probability of OCD is highest for harming (33.8%) and sexual or religious (29.6%) O/C and for 'other' O/C whose content was not specified by respondents (38.9%). In addition, conditional probability of lifetime OCD rises monotonically with number of O/C types and increases sharply (from 7.4 to 36.4%) with four O/C types. The most common O/C among those with lifetime OCD are checking (79.3%) and hoarding (62.3%), whereas the least common are O/C concerning undiagnosed illness in self or others (14.3%).

Course of illness

The mean age of onset of OCD is 19.5 years (s.e. = 1.0). Age-of-onset curves differ significantly for males and females ($\chi^2_1 = 8.1$, $P = 0.004$; Figure 1). Males make up the majority of very early onset cases, with nearly one quarter of males having onsets before age 10. In contrast, females have a much more rapid accumulation of new cases after age 10, with the highest slope during adolescence. There are few new onsets among males or females after the early 30s. Those who develop OCD spend a mean of 8.9 years of life (s.e. = 1.1) with the disorder.

Comorbidity

Fully 90% of respondents with lifetime DSM-IV/CIDI OCD meet criteria for another lifetime DSM-IV/CIDI disorder (Table 2). The most common comorbid conditions are anxiety disorders (75.8%), followed by mood disorders (63.3%), impulse-control disorders (55.9%), and substance use disorders (38.6%). OCD is significantly associated with 17 of the 18

Table 1 Lifetime prevalence of obsessions, compulsions, and DSM-IV obsessive-compulsive disorder ($n = 2073$)

	Prevalence of each O/C in the subsample assessed for OCD % (s.e.)	*Prevalence of lifetime OCD among respondents with each O/C % (s.e.)*	*Prevalence of lifetime OCD involving each O/C*[a] *% (s.e.)*	*Prevalence of each O/C among respondents with lifetime OCD*[b] *% (s.e.)*
I. Types of O/C				
Contamination	2.9 (0.5)	20.3 (7.7)	0.6 (0.2)	25.7 (8.7)
Checking	15.4 (1.0)	11.8 (1.6)	1.8 (0.3)	79.3 (5.4)
Ordering	9.1 (0.8)	14.4 (2.2)	1.3 (0.2)	57.0 (5.3)
Hoarding	14.4 (1.1)	10.0 (1.6)	1.4 (0.2)	62.3 (7.7)
Sexual/religious	2.3 (0.4)	29.6 (7.6)	0.7 (0.2)	30.2 (5.5)
Moral	4.2 (0.6)	23.9 (5.1)	1.0 (0.2)	43.0 (5.2)
Harming	1.7 (0.3)	33.8 (9.3)	0.6 (0.1)	24.2 (4.6)
Illness	1.8 (0.3)	18.2 (4.1)	0.3 (0.1)	14.3 (3.2)
Other O/C	1.1 (0.2)	38.9 (8.0)	0.4 (0.1)	19.0 (6.3)
Any of the above	28.2 (1.5)	8.2 (1.0)	2.3 (0.3)	100.0 (0.0)
II. Number of O/C				
Exactly 1 O/C	15.3 (1.2)	2.9 (0.8)	0.4 (0.1)	19.0 (4.7)
Exactly 2 O/C	6.7 (0.7)	5.1 (1.0)	0.3 (0.1)	14.7 (3.3)
Exactly 3 O/C	2.9 (0.5)	7.4 (2.9)	0.2 (0.1)	9.4 (3.2)
Exactly 4 O/C	1.9 (0.4)	36.4 (8.6)	0.7 (0.2)	30.3 (6.1)
5 or more O/C	1.4 (0.3)	44.0 (7.1)	0.6 (0.1)	26.6 (4.8)

Abbreviations: O/C, obsessions/compulsions; OCD, obsessive-compulsive disorder; s.e., standard error.

[a]Percentages in this column equal the product of the percentages in the preceding two columns. For example, 0.6% of respondents who were assessed for OCD reported a lifetime history of OCD involving contamination-related obsessions or compulsions.

[b]$n = 73$.

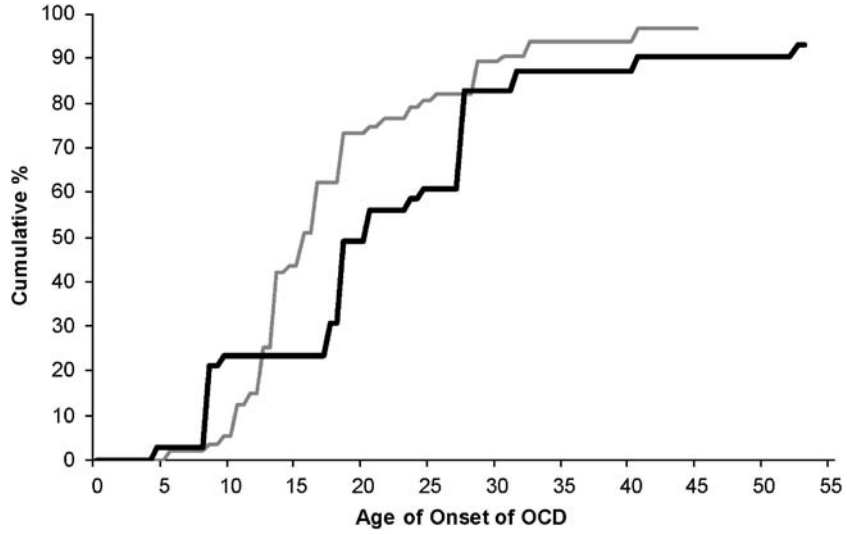

Figure 1 Age of onset of first obsession or compulsion among respondents with lifetime obsessive-compulsive disorder. The cumulative age-of-onset distributions differ significantly for males and females ($\chi^2_1 = 8.1$, $P = 0.004$). Gray line = females, black line = males.

conditions considered here after adjusting for age, sex, and race-ethnicity. The ORs are highest with other anxiety disorders (1.6–6.9) and with mood disorders (3.5–7.4), especially those in the bipolar spectrum (7.4). The ORs are also elevated for impulse-control (2.3–4.9) and substance use (3.2–6.0) disorders.

OCD typically emerges against the backdrop of preexisting mental disorders. OCD begins at a later age than most (79.6%) comorbid anxiety disorders. Two exceptions are separation anxiety disorder, which tends to follow the onset of OCD (53.2%), and posttraumatic stress disorder, which often begins in the same year as OCD (20.7%) and which follows OCD (39.4%) just as often as preceding it (39.9%). The situation is different for mood disorders, where the proportion of comorbid cases where OCD begins before the mood disorder (45.6%) is very similar to the proportion where the mood disorder begins before OCD (40.2%). Most comorbid impulse-control (92.8%) and substance use (58.9%) disorders, in comparison, begin at an earlier age than OCD. Earlier mental disorders predict the subsequent first onset of OCD, with the highest odds of subsequent OCD associated with preexisting bipolar disorder (10.8), agoraphobia (10.0) and panic disorder (7.9), and alcohol dependence (8.9).

Twelve-month symptoms and severity

Roughly half (50.3%) of respondents with lifetime OCD report persistence of the disorder into the 12 months preceding the interview (results not shown, but available on request). These respondents estimate spending an average of 5.9 h per day (s.e. = 1.4) occupied by obsessions and 4.6 h per day (s.e. = 2.4) engaging in compulsions during the past year.

Twelve-month OCD cases in the community fall mainly in the moderate (65.6%) to severe (30.7%) range on the Y-BOCS, with only two 12-month cases (3.7%) classified as mild (that is, Y-BOCS < 20). Moderate cases were compared with severe cases on four theoretically significant features of OCD: (1) early onset, defined as onset before age 18 based on survival curves showing this to be the median age of onset among all projected OCD onsets in the sample; (2) poor insight, defined as rarely or never considering O/C to be excessive or unreasonable; (3) large number of O/C types, defined as having four or more of the nine O/C types assessed in the survey; (4) high comorbidity, defined as having four or more comorbid lifetime disorders. Similar proportions of severe (70.5%) and moderate (77.7%) cases reported a large number of O/C types ($\chi^2_1 = 0.1$, $P = 0.718$). Severe cases were distinguished from moderate cases, though, by having fewer early onsets (36.4 vs 80.7%), higher rates of poor insight (29.5 vs 3.3%), and greater incidence of high comorbidity (78.4 vs 28.9%; $\chi^2_1 = 3.5$–4.4, $P = 0.036$–0.061). Among lifetime OCD cases, poor insight has a strong positive tetrachoric correlation (r^*) with later age of onset ($r^* = 0.71$) and a smaller number of O/C types ($r^* = 0.65$), but is unrelated to comorbidity ($r^* = 0.10$).

Impairment

OCD is often a seriously impairing disorder, with nearly two-thirds (65.3%) of 12-month cases reporting severe role impairment on the SDS (Table 3). As expected, the greatest impairment was found in the clinically severe subgroup, whose modal rating is in the severe range in every SDS domain. The highest impairment ratings for this subgroup are in the domains of relationships and social functioning. Although the moderate subgroup is less impaired,

Table 2 Lifetime comorbidity and temporal order of obsessive-compulsive disorder with other DSM-IV disorders

				Temporal order of OCD and comorbid disorder		
	Percent of OCD cases[a] *with comorbid disorder % (s.e.)*	*Association of OCD with comorbid disorder*[b] *OR (95% CI)*	*Prior disorder predicting OCD onset*[c] *OR (95% CI)*	*OCD first % (s.e.)*	*OCD second % (s.e.)*	*Same-year onset % (s.e.)*
Any anxiety disorder	75.8 (7.6)	7.6* (3.4–16.9)	5.2* (2.6–10.2)	15.2 (5.3)	79.6 (5.8)	5.2 (2.8)
Panic disorder	20.0 (4.5)	6.1* (3.2–11.7)	7.9* (3.4–18.2)	30.3 (12.3)	58.1 (13.9)	11.6 (8.2)
Agoraphobia without panic	7.8 (3.5)	6.9* (2.3–20.8)	10.0* (3.6–28.0)	10.2 (10.2)	89.8 (10.2)	0.0 (0.0)
Specific phobia	42.7 (7.2)	5.1* (2.5–10.2)	4.8* (2.5–9.1)	5.8 (3.4)	91.9 (4.0)	2.2 (2.2)
Social phobia	43.5 (7.4)	6.3* (3.3–11.8)	5.7* (3.1–10.3)	19.0 (6.9)	81.0 (6.9)	0.0 (0.0)
Generalized anxiety disorder	8.3 (2.6)	1.6 (0.7–3.3)	3.0* (1.3–6.5)	16.7 (14.7)	74.4 (17.4)	9.0 (9.7)
Post-traumatic stress disorder	19.1 (4.4)	2.9* (1.6–5.4)	1.9 (0.7–4.8)	39.4 (12.5)	39.9 (13.4)	20.7 (12.4)
Separation anxiety disorder	37.1 (7.9)	5.5* (2.7–10.9)	2.0 (0.8–4.8)	53.2 (12.4)	31.7 (11.1)	15.0 (7.6)
Any mood disorder	63.3 (7.8)	6.9* (3.5–13.7)	4.6* (2.3–9.1)	45.6 (8.1)	40.2 (7.4)	14.2 (4.8)
Major depressive disorder	40.7 (6.2)	3.5* (2.0–6.2)	2.9* (1.2–6.6)	47.1 (9.7)	37.2 (8.9)	15.6 (7.1)
Dysthymic disorder	13.1 (4.1)	5.6* (2.4–12.9)	3.4 (0.9–12.6)	49.9 (16.0)	33.3 (15.6)	16.8 (14.7)
Bipolar disorder (broad)	23.4 (5.8)	7.4* (3.6–15.4)	10.8* (5.6–20.9)	37.3 (13.1)	51.6 (13.0)	11.2 (7.7)
Any impulse-control disorder[d]	55.9 (9.0)	4.8* (2.4–9.6)	5.7* (3.3–9.7)	5.2 (3.3)	92.8 (3.7)	2.1 (2.0)
Oppositional-defiant disorder[d]	27.7 (5.2)	4.9* (2.4–9.9)	5.7* (2.9–11.3)	4.6 (4.5)	91.2 (6.0)	4.1 (4.1)
Conduct disorder[d]	14.2 (4.5)	2.3* (1.0–5.0)	2.6* (1.1–6.2)	8.1 (7.9)	83.1 (11.4)	8.8 (8.6)
Attention-deficit/ hyperactivity disorder[d]	18.8 (6.6)	3.8* (1.7–8.2)	3.7* (1.7–8.1)	0.0 (0.0)	100.0 (0.0)	0.0 (0.0)
Intermittent explosive disorder	18.6 (5.1)	2.8* (1.4–5.3)	3.6* (1.9–6.6)	6.0 (5.9)	90.0 (7.1)	4.0 (4.0)
Any substance use disorder	38.6 (5.5)	4.1* (2.5–6.6)	5.5* (2.8–11.0)	41.1 (9.0)	58.9 (9.0)	0.0 (0.0)
Alcohol abuse/dependence	38.6 (5.5)	4.9* (2.8–8.4)	5.1* (2.5–10.4)	45.6 (9.8)	48.0 (9.7)	6.4 (4.5)
Alcohol dependence	23.7 (5.0)	6.0* (3.1–11.4)	8.9* (4.2–18.9)	27.9 (9.5)	55.0 (11.0)	17.2 (9.1)
Drug abuse/dependence	21.7 (4.8)	3.2* (1.6–6.2)	3.6* (1.5–8.7)	32.0 (9.6)	50.6 (11.1)	17.4 (9.1)
Drug dependence	13.9 (4.1)	4.8* (2.4–9.3)	5.5* (2.1–14.4)	26.4 (12.1)	46.5 (13.8)	27.2 (13.0)
Any disorder[e]	90.0 (6.6)	10.4* (2.5–44.2)	4.9* (2.4–10.0)	20.3 (5.1)	76.9 (6.3)	2.8 (1.9)

Abbreviations: CI, confidence interval; OCD, obsessive-compulsive disorder; OR, odds ratio; s.e., standard error.
*OR significant at the 0.05 level, two-sided test.
[a]$n = 73$.
[b]Estimated in logistic regression models controlling for age at interview, sex, and race-ethnicity.
[c]Based on a discrete-time survival model with person-year as the unit of analysis. Disorders that began prior to the onset of OCD were used to predict the onset of OCD, controlling for person-year, age at interview, sex, and race-ethnicity.
[d]Restricted to respondents ages 18–44.
[e]No adjustment was made for the fact that one or more disorders in the category were not assessed for all respondents with lifetime OCD.

nearly three quarters (73.7%) report clinically significant (severe or moderate) interference in one or more SDS domains, most notably in home management. Past-year OCD is associated with an average of 45.7 days out of role (s.e. = 25.9) in the last 12 months, with the severe subgroup reporting substantially more days out of role on average (129.4) than the moderate subgroup (4.7) ($F(1, 19) = 4.0$, $P = 0.052$).

Treatment

Close to half (49.2%) of 12-month OCD cases reported receiving treatment for emotional problems during the past year (Table 4). Treatment rates were much higher for cases rated severe (93.0%) than moderate (25.6%) on the Y-BOCS, although only a minority of either severe (30.9%) or moderate (2.9%) cases received treatment specifically for OCD. Twelve-month treatment was provided in the general medical and mental health specialty sectors in roughly equal numbers. The proportions receiving treatment in each sector sum to more than the proportion receiving any treatment, suggesting that treatment was commonly received in multiple sectors. The pattern is similar for lifetime mental health treatment, which was obtained

Table 3 Role impairment[a] in 12-month obsessive-compulsive disorder and mutually exclusive severity subgroups

	Moderate OCD % (s.e.)	*Severe OCD* % (s.e.)	*All 12-month OCD*[b] % (s.e.)	χ^2_1 (P)
Home management				
Severe	24.7 (18.2)	56.7 (16.3)	35.3 (12.7)	1.4 (0.241)
Severe or moderate	70.4 (12.4)	75.0 (15.4)	70.9 (8.7)	0.1 (0.823)
Any impairment	78.3 (10.9)	100.0 (0.0)	83.7 (7.2)	244.6 (0.000)
Work				
Severe	5.3 (4.0)	56.7 (16.3)	20.9 (7.7)	7.6 (0.006)
Severe or moderate	37.1 (18.2)	79.9 (12.9)	50.6 (12.5)	2.8 (0.092)
Any impairment	41.7 (18.1)	79.9 (12.9)	53.6 (12.4)	2.4 (0.121)
Relationships				
Severe	31.8 (18.2)	79.9 (12.9)	47.1 (12.4)	3.4 (0.067)
Severe or moderate	43.5 (17.7)	79.9 (12.9)	56.8 (12.4)	2.2 (0.135)
Any impairment	51.1 (17.8)	86.8 (12.3)	63.9 (12.7)	2.0 (0.158)
Social life				
Severe	13.7 (7.1)	79.9 (12.9)	33.6 (9.6)	9.3 (0.002)
Severe or moderate	37.1 (17.9)	79.9 (12.9)	52.6 (12.4)	2.8 (0.092)
Any impairment	44.7 (17.9)	86.8 (12.3)	59.7 (12.7)	2.6 (0.110)
Any domain				
Severe	59.5 (15.1)	79.9 (12.9)	65.3 (9.4)	0.9 (0.339)
Severe or moderate	73.7 (11.5)	86.8 (12.3)	78.7 (7.9)	0.5 (0.493)
Any impairment	81.6 (10.1)	100.0 (0.0)	87.9 (6.2)	230.1 (0.000)
(*n*)	(17)	(9)	(28)	

Abbreviations: OCD, obsessive-compulsive disorder; s.e., standard error.
[a]Values represent the proportions of respondents with 12-month OCD reporting severe (score of 7–10), severe or moderate (score of 4–10), or any (score of 1–10) impairment in each of the four functional domains assessed by the Sheehan Disability Scales. The 1 degree of freedom Wald χ^2 test evaluates whether impairment differs significantly across moderate and severe OCD subgroups defined by the Yale–Brown Obsessive Compulsive Scale (Y-BOCS).
[b]Includes two mild OCD cases.

by nearly three quarters (72.7%) of lifetime OCD cases but which specifically targeted OCD in less than one-third (29.2%) of cases. A far smaller proportion of lifetime cases (6.4%) reported lifetime hospitalization for OCD. All of the hospitalized cases come from the subgroup whose OCD was still present and severe during the past 12 months.

Sociodemographic correlates

Of the sociodemographic variables considered here, the strongest predictor of lifetime OCD is age (results not shown, but available on request), with the odds of onset (ORs in parentheses) highest for respondents in the age range 18–29 (12.0) and decreasing monotonically among those ages 30–44 (7.6), 45–59 (4.9), and 60 + (1.0). Sex is also related to OCD, with the odds of onset significantly higher among females than males (2.1). By contrast, the persistence of OCD, defined as 12-month OCD among lifetime cases controlling for age of onset and number of years since onset, is significantly associated only with parenting status. The odds of a persistent course of illness are lower among respondents with young children (0.0–0.3), significantly so for those with children ages 5–12. The odds of persistence are elevated for females compared to males (2.2) and for the never married compared to the married (2.3), although these ORs do not reach the conventional 0.05 level of statistical significance.

Discussion

The findings reported here should be evaluated in light of several limitations. Although our clinical reappraisal study revealed good concordance between CIDI and SCID diagnoses of DSM-IV OCD, we were unable to re-interview all respondents whose diagnostic status was uncertain and so used regression-based imputation to assign diagnoses in these cases. The present estimates should consequently be regarded as tentative. As we did not re-interview respondents who denied OCD symptoms on the CIDI, the prevalence estimates reported here may be conservative. Furthermore, sample sizes in the analyses are small due to the low prevalence of OCD in conjunction with the fact that OCD was assessed only in a subsample ($n = 2073$) of the Part II sample. This is reflected in the large standard errors and wide CIs of estimates, especially for 12-month cases. Although a strength of the survey was its inclusion of a symptom

Table 4 Treatment of obsessive-compulsive disorder and mutually exclusive severity subgroups

	Twelve-month treatment			*Lifetime treatment*	
	Moderate OCD % (s.e.)	*Severe OCD % (s.e.)*	*All 12-month OCD*[a] *% (s.e.)*	*Lifetime but not 12-month OCD % (s.e.)*	*All lifetime OCD % (s.e.)*
I. 12-month and lifetime treatment[b]					
General medical[c]	13.8 (7.5)	61.2 (17.5)	29.8 (8.0)	53.6 (8.5)	51.6 (7.2)
Mental health specialty[d]	13.4 (7.9)	59.7 (15.9)	33.1 (7.4)	51.8 (9.1)	46.8 (7.4)
Human services[e]	12.3 (6.9)	20.3 (13.0)	12.7 (5.9)	22.3 (6.6)	18.4 (5.1)
CAM[f]	3.0 (3.0)	0.0 (0.0)	5.7 (3.5)	18.7 (6.5)	16.1 (4.1)
Any of the above	25.6 (11.6)	93.0 (6.4)	49.2 (10.0)	81.4 (7.0)	72.7 (7.0)
OCD-specific treatment[g]	2.9 (3.0)	30.9 (18.0)	20.0 (6.4)	32.6 (8.2)	29.2 (5.2)
(*n*)	(17)	(9)	(33)	(40)	(73)
II. Lifetime hospitalization[h]					
Hospitalized for OCD	0.0 (0.0)	21.8 (18.7)	12.4 (6.7)	0.0 (0.0)	6.4 (3.1)
(*n*)	(17)	(9)	(33)	(40)	(73)

Abbreviations: CAM, complementary-alternative medicine; OCD, obsessive-compulsive disorder; s.e., standard error.
[a]Includes two mild OCD cases plus five respondents with lifetime OCD who denied 12-month symptoms but reported their age of most recent OCD symptoms to be the same as their age at interview. These respondents were treated as 12-month OCD cases wherever data were available.
[b]Values represent the proportions of respondents with OCD who reported receiving treatment for any mental health problem in each treatment sector. Twelve-month treatment is reported for all respondents with 12-month OCD and for moderate and severe OCD subgroups defined by the Yale–Brown Obsessive Compulsive Scale (Y-BOCS). Lifetime treatment is reported for all respondents with lifetime OCD and for respondents with lifetime OCD who were not in episode during the previous 12 months.
[c]Includes primary care doctor, other general medical doctor, nurse, any other health professional not mentioned elsewhere.
[d]Includes psychiatrist, psychologist, or other mental health professional in any setting; social worker or counselor in a mental health specialty setting; use of a mental health hotline.
[e]Includes religious or spiritual advisor, social worker or counselor in any setting other than a specialty mental health setting.
[f]Includes any other type of healer, participation in an internet support group, or participation in a self-help group.
[g]Refers to treatment obtained specifically for OCD in any setting.
[h]Refers to overnight hospitalization specifically for OCD.

rating scale (the Y-BOCS) that is familiar to clinicians, a limitation was that some respondents were administered only the obsessions or compulsions subscale. Our scoring method of doubling the higher subscale was grounded in prior clinical research, but was less precise than administering both subscales to all respondents and may have overestimated severity. Finally, while diagnoses of anxiety, mood, and substance use disorders were validated through clinical reappraisal, diagnoses of impulse-control disorders were not validated, and particular caution is warranted when interpreting the associations of OCD with these disorders.

With these limitations in mind, the comprehensiveness of the CIDI allowed us to explore several aspects of the epidemiology of OCD that have heretofore been neglected in the epidemiological literature. First, we obtained estimates not only of the DSM-IV OCD diagnosis, but also of the major categories of obsessions and compulsions associated with OCD in clinical studies.[22,37] Our findings of lifetime prevalence of 2.3% and 12-month prevalence of 1.2% for the OCD diagnosis are similar to estimates from several previous studies, including the Epidemiologic Catchment Area program (lifetime prevalence ranging from 1.9 to 3.3%),[42] the Cross National Collaborative Group (12-month prevalence ranging from 1.1 to 1.8%),[38] the British National Psychiatric Morbidity Survey of 2000 (1-month prevalence of 1.1%),[37] and a number of other surveys.[14,39] It is noteworthy that these estimates were derived from lay interviews, which past studies have suggested may overestimate the prevalence of OCD relative to clinical interviews.[40,41] At the same time, our finding that more than one quarter of respondents reported obsessions or compulsions at some time in their lives is consistent with other work suggesting that the OCD spectrum, including subclinical OCD, may be more prevalent than previously expected.[11,42] The current data support growing evidence that OCD symptoms are experienced by many people without the full OCD syndrome and raise the possibility that the public health burden of OCD may be greater than is implied by the prevalence of the diagnosis.

Like previous studies,[8,9,22] we found that OCD is characterized by significant persistence and impairment. The NCS-R data on persistence suggest that the typical person with OCD spends an average of 8.9

years of life with the disorder, with half of all lifetime cases still having the disorder at the time of interview. The NCS-R data on time consumed by obsessions and compulsions (means of 5.9 and 4.6 h per day, respectively) and on functional impairment (nearly two-thirds of 12-month cases reporting severe role impairment) suggest that OCD has a marked influence on the lives of many people with the disorder. Although these findings provide new details about the impact of OCD in the population, they are quite consistent with findings from other epidemiological surveys where results can meaningfully be compared. For example, the British National Psychiatric Morbidity Study of 2000 found that 59.4% of OCD respondents reported much interference in social activities and 74.5% reported much interference in work and regular activities.[37]

Extending these estimates, we provide new data on the association between impairment and OCD severity. Severe cases (defined by the Y-BOCS), while representing one-third of 12-month OCD cases in the community, account for the vast majority of severe role impairment due to OCD in work, home, relationships, and social functioning. Severe cases in the community not only are more impaired, but also have poorer insight and greater psychiatric comorbidity than moderate cases. Although a small minority of those with OCD have been hospitalized for the disorder, lifetime hospitalization is concentrated entirely among the most severe and persistent OCD cases, namely the severe cases who still had the disorder in the past 12 months. The strong, consistent associations observed here between severity and important outcomes suggest that the utility of the OCD diagnosis might be enhanced by specifying severity as part of the formal multiaxial diagnosis of the disorder, as is currently done for major depressive disorder and has been recommended for a number of other disorders as well.[43]

Our results indicate that severe OCD cases are much more likely than moderate cases to come to the attention of mental health professionals. In fact, severe OCD is one of the few disorders in the NCS-R where the vast majority of 12-month cases receive treatment.[44] At first glance, this appears to suggest that the 'treatment gap' representing unmet need is largely confined to moderate OCD cases. However, our results also indicate that only a minority of severe cases receive treatment specifically for OCD. The proportion receiving treatment with demonstrated efficacy for OCD may be lower still, but could not be estimated from the data available. In addition, even cases that are considered moderate by the Y-BOCS have impairments as severe as those found for many severe cases of other mental disorders.[45] Consequently, there is still a treatment gap for OCD that needs to be addressed.

We were able to document the comorbidity of OCD with a wider range of other DSM-IV disorders than those assessed in previous community surveys. While we found comorbidity to be highest with other anxiety disorders, comorbidity was also high with impulsive and substance use disorders. Moreover, the single largest OR was with bipolar mood disorders, a disorder spectrum characterized by impulse dyscontrol as well as emotion dysregulation. These findings are consistent with a prior epidemiological and clinical literature emphasizing the importance of impulsive symptoms in OCD and OCD spectrum disorders[46–49] as well as with recent interest in the psychobiology of impulse dyscontrol in these conditions.[50,51] Nevertheless, these findings are tempered by several limitations of our data, including the unavailability of clinical validation data for CIDI diagnoses of impulse-control disorders and the inability of this survey, like most national surveys, to distinguish adequately between the different putative OCD spectrum disorders (e.g., Tourette's disorder, body dysmorphic disorder, hypochondriasis). It is noteworthy that, paralleling our comorbidity results, some family studies have found anxiety and mood disorders to be at least as common, if not more common, in the relatives of OCD cases as somatoform or 'grooming' disorders proposed for the OCD spectrum.[52,53] Our findings consequently underscore the complexity of the relationships between OCD and comorbid disorders that others have also observed.[54–56] Additional work is needed to specify causal mechanisms underlying these patterns of comorbidity, including family studies, but the data here suggest a number of promising avenues for exploration.

We also provided preliminary epidemiological data on a number of putative OCD subtypes. First, there is growing interest in the idea that different kinds of obsessions and compulsions correspond to different subtypes or symptom dimensions of the disorder.[17,57] At the same time, many people suffer from multiple obsessions and compulsions; indeed, we found that a larger number of O/C types is associated with greater OCD risk, and that lifetime OCD cases tend to report a larger variety of obsessions and compulsions than individuals without OCD. This seems to argue against the existence of mutually exclusive subtypes distinguished solely by the kinds of obsessions and compulsions reported. However, with a larger sample of OCD cases, it might be possible to detect subtypes corresponding to different symptom dimensions in the community. Second, considerable attention has been paid to the possibility of an early onset subtype of OCD.[19,20] Although our survey was unable to assess the tics that have been classically associated with early onset OCD, we were able to support prior clinical findings that early onset OCD is predominantly associated with male sex. Third, the data here are consistent with previous work demonstrating an association between poor insight and greater symptom severity in OCD.[21,22]

Although these findings are suggestive, the sample contained too few OCD cases to support more detailed analysis of putative subtypes. Future research with larger samples is needed to evaluate the structure of OCD more directly and to consider other important

correlates that may distinguish putative subtypes. Future work is also needed to evaluate the clinical significance of subsyndromal OCD and to determine whether the validity of the OCD diagnosis can be improved by modifying the current diagnostic criteria or threshold. Analyses of this sort are planned for the World Mental Health Surveys,[58,59] a coordinated series of general population surveys recently carried out in 28 countries. This cross-national dataset should provide the larger number of OCD cases needed for powerful analysis of possible subtypes and would permit evaluation of the generalizability of the present findings to other countries. Along with emergent clinical and basic research on OCD, such epidemiological research has the potential to further advance our understanding of this disabling disorder.

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