Obsessive-Compulsive Disorder

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3258 randomly selected adult household residents of Edmonton were interviewed by trained lay interviewers using the Diagnostic Interview Schedule (DIS). One of the diagnostic categories studied was obsessive-compulsive disorder (OCD). The lifetime and six month prevalence rates of OCD were 2.9% and 1.6% respectively. The morbidity risk, was equal in males and females at 5.4%. The peak age of risk of onset for both sexes was from the ages of 10 to 19 and, closely followed by the decade 20-29. Obsessions were found to be more frequently experienced than compulsions. Having a lifetime diagnosis of OCD is associated with an increased likelihood of developing depression, alcohol abuse, drug abuse, phobic disorders, and antisocial personality disorder. The significance of these findings is discussed for clinical practice.

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Introduction

Historical perspective

Recent evidence suggests that obsessive-compulsive disorder (OCD) is not as rare as once was thought (1). In fact, even for a previously "rare" disorder there are remarkably well-documented descriptions dating as far back as 4000 years ago in Mesopotamia (cited in Frazier & Goldstein) (2). The earliest case report appeared in 1660 under the description of "scruples". Jeremey Taylor gave an account of William of Oseney, an "overscrupulous (man) in religious matters" (3). John Moore's (1692) pertinent description of OCD under the guise of religious melancholy stated, "they suffer from scrupulosity and are overpowered by naughty and sometimes blasphemous thoughts which start in their minds....despite all their endeavours to stifle and suppress them". Since the 17th century, case reports of obsessive-compulsive illnesses gained further recognition under a variety of headings including Esquirol's "monomanie raisonante" (4), Janet's "folie du doute" (5), Westphal's "abortive insanity" (6), and Fenichel's "obsessive-compulsive neurosis" (7). In fact it was Westphal who formulated the modern description of the syndrome. Freud (8) contributed a psychoanalytical understanding of the disorder implicating the obsessive state as a manifestation of psychological defences against "repressed memories of sexual guilt". He stressed the importance of the intrapsychic conflict these patients experienced.

Perhaps Pierre Janet (5) is due the most credit for his detailed clinical descriptions of over 300 collected cases of obsessive-compulsive neuroses. Indeed Janet designated OCD as one of the major classes of mental disorder and his concept of this disorder was well ahead of his time. He proposed three clinical stages of the psychasthenic illness. The psychasthenic state in which there is a feeling of incompleteness, doubt and depersonalization; the forced agitations which could occur under demanding circumstances either as mental manias and ruminations, motor tics and agitations or emotional phobias and anxiety; obsessive-compulsive state proper, which would dominate the patient's mental life. Janet suggested this schema as a hierarchy whereby the presence of the third stage implied that stages one and two were already present. In comparison to the current DSM-III-R approach where obsessions and compulsions are central items, for Janet these were the final and most severe stages of the disorder and were not invariably present. Janet also proposed an obsessive continuum whereby individuals exhibited normal obsessive behavior which could develop into an obsessive personality and subsequently into a full-blown obsessional neurosis.

Etiology

Following the epidemic of encephalitis lethargica between 1915 and 1926, it was noticed that the frequency of reported cases of OCD increased (9, 10). Schilder (11) postulated an organic cause of OCD based on this observation and looked for other neurological abnormalities. He concluded that at least two-thirds of OCD patients had organic causes, be they cerebral lesions in fetal life, birth trauma, toxic or infectious processes. Subsequent studies have reported a higher than expected frequency of abnormal births in patients who developed obsessive

symptoms (12). Grimshaw (13) found 19.4% of his 103 obsessive patients had a history of neurological disorders including Sydenham's chorea and encephalitis versus 7.6% of controls. Hillbom (14) found 3.4% of OCD cases among 415 war-related head injuries. Obsessional symptoms have been observed to occur as an interictal phenomenon in temporal lobe epilepsy (15). Further evidence to support this cerebral dysfunction hypothesis comes from Flor-Henry et al. (16) who observed marked deficits in OCD patients in neuropsychological test performance implicating left frontal lobe dysfunction. They also noted a high incidence of sinistrality (27%) in their OCD patients, again suggestive of a laterality deficit.

Phenomenology

It has been remarked upon previously (17) that of all the ways one might obsess or ritualize, patients with OCD present with a relatively restricted repertoire of symptoms. The four most common symptoms appear to be:

1) Contamination fears with associated washing rituals. This affects about 55% of all patients (18, 19, 20). The obsession centres around fear of contamination by dirt, germs or bodily secretions. Patients avoid areas such as public washrooms and door knobs. They consume hours of time in the bathroom (much to the distress of other family members). Yet paradoxically many are rather slovenly in other ways. A study of 44 patients with OCD found 83% of these patients had cleaning rituals, 80% had checking rituals and 21% had counting rituals (18).
2) Pathological doubt associated in particular with checking rituals. These patients fear that lights have been left on and doors are left unlocked, resulting in compulsive checking. This can evolve into "magic rituals" such as counting in a certain pattern or number of times. The checking often does not reassure them and they are plagued with guilty feelings that they have caused others harm through their carelessness.
3) Intrusive urges or thoughts particularly of a sexual or aggressive nature which are repetitive and reprehensible. They may give rise to impulses of horrific temptation although, interestingly, obsessive-compulsive patients rarely carry these out. About 25% of patients fall into this category (19, 20).
4) Primary obsessional slowness. This is a rare yet very disabling syndrome in which the patient takes hours to complete one task due to extensive rituals and severe obsessional preoccupations. Some fairly dramatic case reports have been cited (17).

These symptom clusters can occur separately or may be blended together. Rasmussen and Tsuang found that 41% of those studied exhibited more than one ritual and 59% were found to have multiple obsessions (18). It is less likely that patients have obsessions alone (4.5%) (20, 21). Even more uncommon is the occurrence of compulsions alone (2 - 6%) (18, 22). It has also been noted that symptoms can shift during the life span of the illness (17) so that, for example, checkers can become washers.

In his classical study on obsessional illness, Lewis (23) claimed that there were two essential components of obsessional ruminations and rituals. These were compulsion and resistance. This has since been disputed (21, 24). In Stern and Cobb's study (21) it was found that 46% of patients showed slight or no resistance to their rituals. What seemed more important was the patients' recognition of the senselessness of their rituals and thoughts: 78% rated them as absurd versus 54% who showed moderate to maximum resistance. If resistance did occur it was more likely to be toward repeating the action rather than the action itself. These concepts seem to have been incorporated into the current DSM-III-R criteria.

The current DSM-III-R definition emphasizes that either compulsions or obsessions can occur which cause significant distress to the individual and in some way interferes with his or her lifestyle. Obsessions are defined as concurrent persistent ideas, thoughts, images or impulses that are experienced as intrusive and senseless. Compulsions are repetitive seemingly purposeful behaviors performed in response to the obsession or in a stereotyped manner. The act is performed with a sense of compulsion coupled with a desire to resist the compulsion (at least initially). Similarly, it is usually recognized as senseless or unreasonable.

Prevalence and incidence

The rarity of this disorder, accepted in the literature early in this decade, has been questioned by the recent Epidemiologic Catchment Area (ECA) study. In earlier studies, the prevalence for adults suffering from OCD in a general psychiatric in-patient setting was estimated between 0.5 and 2.5% (25) although Pollitt (26) found it as high as 4%, and in an outpatient setting between 0.6 and 2%.

However the first three sites of the ECA study found the six-month and lifetime prevalence estimates to be consistently higher than these earlier estimates (Table 1). When the three sites were averaged, OCD

Table 1. Prevalence rates of obsessive compulsive disorder in the ECA study - by sex (1, 27)

Prevalence period		Site		
		New Haven (%)	Baltimore (%)	St. Louis (%)
Six month				
	Male	0.9	1.9	0.9
	Female	1.7	2.2	1.7
	Both sexes	1.4	2.0	1.3
Lifetime				
	Male	2.0	2.6	1.1
	Female	3.1	3.3	2.6
	Both sexes	2.6	3.0	1.9

affected 1 in every 40 adults (on a lifetime basis), making it 50 times more common than believed prior to the study (double that of schizophrenia and panic disorder) (27).

The reasons for such underreporting of this disorder include the secretiveness of patients and their reluctance to talk about their rituals and obsessions. Even their families are often unaware of the patient's symptoms. Maybe more important is a failure to ask obsessive-compulsive screening questions in the routine mental state examination.

There are no recent data on the incidence of OCD among children. Judd (28) found it to be rare, occurring in only 1% of child psychiatric in-patients. Hollingsworth et al. (29) reported a low incidence of 0.2% based on 8,000 in- and out-patient records, and Rutter (30) found no cases among 2,000 10- and 11-year-olds in the Isle of Wight. Like the earlier adult studies, it would not be surprising to discover that these rates are underestimates for the same reasons cited above.

Sex differences

There is reasonable consistency in the data on sex ratio in OCD (1, 27, 31, 32). Most authors agree that the rates are similar in both males and females (25). Table 1 shows the 6-month and lifetime prevalence of OCD by sex in the ECA study (the ratio of women to men was quite similar in the three sites). One recent study (33), however, did find a statistically significant difference in males (41%) versus females (59%) but this was based solely on outpatients receiving treatment from a single university hospital-based clinic. Such a sample is probably not representative of the general population.

Age of onset

It is likely that the incidence of OCD in childhood is higher than the 0.2 - 1% currently quoted because symptoms are concealed for many years (34). In view of this, the age of onset may be earlier than most studies report. Some authors have reported a childhood onset OCD (35,36), even as early as six years old (37, 38, 39). But most studies cite the mean age of onset to be from 20 to 26 years. Rasmussen (18) is more specific and finds that males have a mean age of onset of 15.5 ± 5.4 compared to 22.9 ± 12.6 for females. Despite this the DSM-III-R is rather vague in stating a specific age of onset and identifies adolescence and early adulthood as the vulnerable period with a brief reference to a possible childhood onset.

A closer look at the age distribution suggests there may be a bimodal pattern with peaks occurring at 12 - 14 and 20 - 22 years (18). A decline in onset of symptoms after age 35 has been noted by several authors (18, 19, 36, 37, 40). When this distribution is assessed according to sex, a more even distribution by age for both sexes is observed (1) (Table 2). Interestingly, OCD ranked as the fourth most frequent psychiatric disorder in females for the age groups 25 - 44 and 45 - 64 years (1).

As is well known, age of onset does not necessarily coincide with age of first psychiatric contact. In the case of OCD there is a considerable delay. A lag of seven to sixteen years has been reported (18, 22) and in more moderate to severe cases even as much as a 20-year delay has been observed (18).

Course and prognosis

There seem to be few recent follow-up studies of OCD. Most authors refer to the earlier follow-up studies of Lo (37), Pollitt (26), Kringlen (36), Ingram (38), and Muller (41). Goodwin et al. (40) reviewed 13 of these follow-up studies and suggested that the course was: 1) unremitting (with or without social impairment), in which 10 - 15% of cases had clear-cut deterioration; 2) episodic or fluctuating with complete remission; or, 3) characterized by incomplete remission which permitted no social functioning. Although Pollitt (26) found most of his patients fell into the episodic group, the majority of authors (37, 38, 39, 41) noted a gradual deterioration in the

Table 2. Range of six month prevalence rates of obsessive compulsive disorder in the ECA study

Age	Male (%)	Female (%)
18-24	0.9 - 2.1	2.6 - 2.8
25-44	1.3 - 1.7	1.5 - 3.1
45-64	0.2 - 2.4	0.8 - 1.3
65+	0.2 - 1.2	0.4 - 1.3

course of the illness. Despite this finding, these studies offered some optimism for the prognosis of OCD. Collectively, five of these studies, reviewed by Jenike (42), showed a 45% improvement rate in a total of 246 patients followed up after four years.

Favorable prognostic factors include the following: 1) mild symptoms - Goodwin (40) noted that of such cases treated as out-patients, 60 - 80% were asymptomatic one to five years later; 2) atypical symptoms with a predominance of phobic ruminative ideas and an absence of compulsions; and 3) a short duration of symptoms prior to treatment. Unfortunately, most patients wait until symptoms are severe enough to cause serious social or occupational dysfunction before going for treatment (18); and 4) good premorbid personality with no childhood symptoms or abnormal personality traits.

In contrast to the favorable prognostic factors (18), the following were found to be indicative of a poor prognosis: 1) males with an early age of onset; 2) symptoms which involved the need for symmetry or exactness; 3) the presence of hopelessness, delusions and hallucinations; and, 4) a family history of OCD (18). These were similar features that Foa (43) found in her group which failed to respond to behavioral therapy.

The mode of onset can be acute or insidious. It has been suggested that precipitating factors (events occurring within one year of the onset of OCD which are considered to be related to the onset of symptoms) include pregnancy and childbirth (26, 37, 38), overt sexual trauma (26), and death of a close friend, but in most series 40% had no identifiable precipitant. DSM-III-R does not provide any criteria for the course of OCD yet the literature would suggest that patients with OCD follow either a continuous, episodic or deteriorating course.

Premorbid personality

The role of compulsive personality disorder (or obsessive personality) in OCD has been debated throughout the literature. Janet did not believe that all patients with OCD displayed a premorbid obsessional personality (44, 45). He did propose that at some stage they all had to display the stigmata of the underlying psychasthenic state, experiencing feelings of incompleteness and an inner sense of imperfection. This psychasthenic state may or may not endure long enough to be recognised as a personality disorder. DSM-III-R has revised the DSM-III compulsive personality disorder category. It now appears as obsessive-compulsive personality disorder. In addition to the features of restricted emotional expression, perfectionism, indecisiveness, authoritarianism and devotion to work (the first four are all features of Janet's psychasthenic state), the DSM-III-R includes a pre-occupation with details and orderliness, scrupulousness and inflexibility, lack of generosity, and an inability to discard worn out worthless objects. These additional features reflect the concept of compulsive personality with anal erotic traits, an interpretation advocated by Freud (46). Kaplan (31) comments on the ubiquity of obsessionality in many normal individuals in which orderliness, rigidity, frugality and perfectionism are ego syntonic. Obsessive traits can occur in individuals who never become mentally ill. These traits may also be present in those who become mentally ill with conditions other than OCD.

Most studies on premorbid personality in OCD predate the DSM-III. Because of variations in methodology and sample selection it is difficult to make comparisons. However, in reviewing this literature, Black (47) noted that 71% of OCD patients had a clear-cut premorbid obsessive personality. Kaplan (31) cited 92% of OCD patients versus 52% of a neurotic control group (anxiety states, hysterical and depressive neurotics) had obsessive traits based on a series of studies (26, 36, 37). Kringlen (36) found that 83% of patients in the obsessional group versus 72% in the neurotic control group had been 'nervous' as children. The obsessionals were significantly more obsessive premorbidly than the control group. Both Rosenberg (48) and Lo (37) found that only half of the OCD patients had a premorbid obsessive personality. Unfortunately these studies were completed before the introduction of DSM-III, making comparison studies difficult because of methodological variations and different sample selections. However, this result was replicated recently using DSM-III criteria and 55% of OCD patients also had an Axis II diagnosis of compulsive personality disorder (18).

Several studies have shown that compulsive personality is not necessary for the development of OCD. For example, Kringlen (36) found 28% of OCD patients with no premorbid obsessive traits (leaving 72% with moderate to marked traits). This is in accordance with the 30% found by Rudin (39) and 34% by Pollitt (26). Black's (47) figures of 16%-36% and Rasmussen and Tsuang's (18) of 34% with no Axis II diagnosis also add weight to this observation. Based on these findings, it is unlikely that OCD is an over-emphasis of characteristic personality traits in a continuum with an inevitable outcome of developing a full-blown OCD. Moreover, there is evidence that compulsive personality is linked to other psychiatric disorders, depression in particular (23, 36).

Family studies

First-degree relatives of OCD patients appear to have a higher than normal incidence of a wide variety of psychiatric disorders including obsessionality. Rosenberg (49) found 9.3% of the siblings of obsessional neurotics had received psychiatric treatment. The commonest disorders among these relatives were anxiety, phobias, depression and schizophrenia. Only 1.4% (2 cases) had OCD. Lewis (23) studied 50 families of OCD patients and among the parents found 4 to be psychotic, 22 suffered from a neurotic illness, and 30 were described as 'eccentric' or 'different'. Of the 206 siblings, 12 had been hospitalized in mental hospitals and 55 had received treatment for neurotic illnesses. 37 parents and 43 siblings showed a range of mild to severe obsessive traits. Insel et al. (50) reported on 10 families of patients with severe OCD. Although they found no cases of OCD, 11.6% of these first-degree relatives had been hospitalized for psychiatric reasons. They suggested that affective disorders and depressive spectrum disorders in particular have a rather higher incidence in the parents of OCD patients compared to the general population.

When looking more specifically at the number of cases of OCD among the first-degree relatives of OCD probands, the literature suggests that less than 10% of relatives suffer from the disorder. Brown (51) found 7.5% of the parents and 7.1% of the siblings of OCD patients had obsessive neurosis compared with none in a neurotic control group. Rudin (39), reporting on 130 cases of OCD, found 4.6% of parents and 2.3% of siblings with obsessional symptoms. Obsessive symptoms in the parents alone were found in 3.8% by Lo (37), 0.4% by Rosenberg (49), and 6.2% by Carey and Gottesman (52). The presence of obsessive traits in the parents appears to be somewhat more common than frank OCD. Lewis (23), Brown (51), Kringlen (36), Lo (37), and Rudin (39) reported that between 3.3% to 37% of parents of OCD index cases have significant obsessional traits. These studies suggest that first-degree relatives of OCD patients have a higher than normal incidence of obsessionality but little evidence of frank OCD.

Other authors (50) have observed that although parents did not have OCD they did score higher on the Leyton Obsessional Inventory (53) but had low scores on interference and resistance scales. Possibly what distinguishes some OCD cases from non-cases is their response to these symptoms (their inability to resist) rather than their rituals and ruminations.

The limitations of these family studies are frequently remarked upon and include: 1) variations in diagnostic criteria (these family studies span several eras of psychiatric classifications); 2) a paucity of controlled investigations; 3) and, most importantly, a lack of personal interviews. Nearly all studies were carried out by chart review or patients reporting on their families.

Twin studies

Although the evidence for a completely penetrant hereditary transmission of OCD is not supported by twin studies because of the finding of discordant monozygotic (MZ) twin pairs, there does appear to be some genetic influence. Twin studies suggest that MZ twins are more likely to be concordant than dizygotic (DZ) twins for OCD. Carey and Gottesman (52) found an 87% concordance rate in 15 obsessive MZ twins who sought treatment for obsessive symptoms, versus 47% in 15 DZ twins. Inouye (54) measured concordance for obsessional features (rather than symptoms) in 10 MZ and 4 DZ twins and found a concordance rate of 80% and 50% respectively. However, in one of the largest twin studies of psychiatric disorders (318 probands), Torgersen (55) found no MZ twin pairs in which both twins had the same anxiety disorder (including OCD). Although, over the past 50 years, there have been reports of at least 32 pairs of MZ twins concordant for OCD and 19 discordant for the disorder, general agreement on diagnosis and monozygosity exists for only 13 pairs of the concordant and 7 pairs of the discordant twins (54). Ideally, studies of OCD in adopted MZ twins raised apart would help minimize the possible environmental effects of imitation and identification between them. At one time this study design was unfeasible because of the small numbers involved. Now that recent literature suggests a higher prevalence for OCD, such studies can now be contemplated.

Materials and Methods

The data for this paper were obtained from a survey carried out (56) in the city of Edmonton, Canada, between January 1983 and May 1986 (56). Information was gathered on 3258 community residents using the Diagnostic Interview Schedule (DIS) (57, 58) and the General Health Questionnaire - 30 item version (59). All interviewers were trained using the methods of Washington University, St. Louis. The selection of respondents was made from a municipal census of private dwellings. Outlying rural areas and any institutions were not included. To be eligible for the survey, respondents had to be 18 years of age or older and a usual occupant at the address. No information was collected from house-

holds refusing to participate in the survey. Proxy interviews and respondent substitutions were not allowed. A respondent selection grid method (60) was used to ensure that over the course of many interviews the age and sex composition of the survey sample would be representative of the households participating in the survey. The methodology and sampling procedures of this study have been described in detail elsewhere (56).

Obsessive-compulsive disorder data were derived from the DIS. In addition the DIS elicits the type of obsessive-compulsive symptoms experienced, the onset of the syndrome, and the last date in which DSM-III criteria were met.

DIS derived DSM-III diagnoses, in addition to obsessive-compulsive disorder, were used to describe comorbidity. Lifetime diagnoses are used; that is, had the respondent ever had the disorder. Diagnoses were made without exclusion criteria, that is, hierarchy-free, and with full severity criteria.

Except where indicated, all have been weighted for household size and post-stratified to the 1981 census of Edmonton by age and sex.

Results

The response rate was 71.6%. Using unweighted data, 103 cases met the criteria for DIS/DSM-III obsessive-compulsive disorder at some time during their lives.

Lifetime prevalence

The lifetime prevalence rate for OCD was 2.9%; 2.8% for males and 3.1% for females, suggesting the disorder is equally prevalent in both sexes. Thus about one of every thirty people has or has had OCD.

Table 3 shows the rates by age group and sex. OCD was found to be more prevalent in the three groups ranging in age from 25 - 54, with the highest values in the 25 - 34 year-old group. This trend diminished in both the youngest and oldest age groups.

Period prevalence

The six-month prevalence rate, using weighted data, was 1.6% for both sexes combined. Table 4 shows the rate for specific age groups by sex. For males the prevalence rate rises steadily with age until the 45-54 age group, when the value peaks at 2.9% and then declines. In females the pattern is more variable. The highest peak occurs in the 25-34 year-old age group but a smaller peak is present in the 65 and older group. Overall there is little difference between the age groups.

The one-year recovery rate is defined to be the percentage of individuals who had ever met the criteria for OCD but had not experienced any symptoms in the year prior to the interview. For our data, the one-year recovery rate of OCD was 38.7% suggesting that 61.3% of individuals did not recover and had symptoms present in the year prior to being interviewed.

Morbidity risk

The lifetime morbidity risk of OCD is the probability of developing OCD if one lives a "normal" life span. The lifetime morbidity risk was calculated according to the method of Newman et al (62), and it was found to be equal for males and females at 5.4%.

Table 3. Lifetime prevalence rates for obsessive compulsive disorder (weighted)

Age	Number of unweighted cases, both sexes	Prevalence rate (%) (SE)		
		Both sexes (N=3258)	Male (N=1330)	Female (N=1928)
18-24	17	2.8(0.8)	3.3(1.3)	2.4(0.8)
25-34	42	3.6(0.6)	2.2(0.7)	5.1(1.0)
35-44	21	3.1(0.7)	3.3(1.2)	2.9(0.9)
45-54	11	3.4(1.1)	4.3(1.9)	2.4(1.1)
55-64	5	1.4(0.7)	1.4(1.1)	1.4(0.8)
65+	7	2.5(1.0)	2.2(1.6)	2.7(1.4)
Total sample	103	2.9(0.3)	2.8(0.5)	3.1(0.4)

N is the total unweighted sample

Table 4. Six month prevalence rate of obsessive compulsive disorder in Edmonton (weighted)

Age	Number of unweighted cases, both sexes	Prevalence rate (%) (SE)		
		Both sexes (N=3258)	Male (N=1330)	Female (N=1928)
18-24	9	1.1(0.4)	0.9(0.6)	1.2(0.5)
25-34	20	1.8(0.4)	1.4(0.6)	2.2(0.6)
35-44	13	2.3(0.7)	2.8(1.2)	1.8(0.7)
45-54	8	2.2(0.8)	2.9(1.3)	1.5(0.9)
55-64	4	1.0(0.6)	1.4(1.1)	0.7(0.5)
65+	4	1.5(0.8)	0.9(0.9)	1.9(1.2)
Total sample	58	1.6(0.2)	1.6(0.4)	1.6(0.3)

N is the total unweighted sample

Table 5. Percentiles of the age of onset of obsessive compulsive disorder by sex in Edmonton (weighted)

Percentile	Age (years)	
	Male	Female
5th	12	6
50th	20	19
95th	38	32

Onset based on recall of first symptoms.

Age of onset

The age of onset for various percentiles is shown in Table 5. For males, 95% of cases have acquired the disorder by age 38, and for females by age 32. At the other end of the scale, 5% of males have been diagnosed by age 12 and for females by age 6. Fifty per cent of males are diagnosed by age 20 and by age 19 for females. There appears to be little difference between the sexes.

Symptom analysis

In the analysis of OCD symptoms, obsessions were found to be more frequently experienced than compulsions. Of the obsessions the two most common were recurrent unpleasant thoughts of: a) harming someone; and, b) unreasonable fears of germs or of relatives dying. Patients who experienced either of these totalled 61.1%, although recurrent thoughts of harming someone clearly outnumbered any other obsession (Table 6). Of the compulsions the two most common were: a) having to do something over and over knowing it is foolish, e.g. checking; b) being unable to resist doing something, e.g. counting floor tiles. Cases experiencing either of these totalled 55.6% (Table 6).

Table 6. Proportion having obsessive compulsive symptoms in those with lifetime diagnosis of OCD, both sexes combined (weighted)

Symptoms	Proportion (N=103) (%)
Obsessions	
Recurrent unpleasant thoughts, e.g. harming someone	56.3
Recurrent unpleasant thoughts, e.g. unreasonable fear of germs or of relatives dying	4.8
Either of the above	61.1
Compulsions	
Having to do something over and over, knowing it is foolish, and checking	35.3
Unable to resist doing something, e.g. counting floor tiles	27.4
Either of the above	55.6

Regarding the obsessions, there appears to be no overlap in the symptoms experienced by patients , i.e. obsessions tend to be specific and occur in isolation. Compulsions, however, may overlap, i.e. the patient may have more than one compulsion at any one time. Only 16.8% of patients experience both obsessions and compulsions together. None of these symptoms are found in non-OCD cases making them highly specific for OCD.

There appears to be no significant difference between males and females in the symptoms experienced in the DIS categories of compulsions. However, females have a tendency to experience more symptoms in the DIS categories of obsessions than males but this is not statistically significant.

Comorbidity

This examines the frequency of other DIS disorders occurring in patients with a lifetime diagnosis of OCD. This is then compared with the rest of the population sample who did not meet criteria for OCD sometime during their lifetime (see Table 7).

Table 7. Comorbidity: lifetime prevalence rates of DIS disorders in those with and without a lifetime diagnosis of obsessive compulsive disorder, both sexes combined (weighted)

Other psychiatric disorder	Lifetime diagnosis of OCD (%)		
	Present (N=103)	Absent (N=3155)	Prevalence ratio
Any disorder listed (except OCD)	73.9	31.7	2.3
Affective disorders			
Mania	2.7	0.5	5.4
Depression	29.6	8.0	3.7
Dysthymia	12.4	3.4	3.6
Substance use disorders			
Alcohol abuse/dependence	35.9	17.4	2.1
Drug abuse/dependence	26.5	6.3	4.2
Schizophrenia/schizophreniform			
Schizophrenia	11.4	0.2	57.0
Schizophreniform	0.8	0.1	8.0
Anxiety disorders			
Phobia	44.7	7.8	5.7
Panic	9.8	1.0	9.8
Somatization	0.0	0.1	–
Antisocial personality	10.1	3.5	2.9
Anorexia	0.4	0.1	4.0

DSM III exclusion criteria were not used. Prevalence ratio was not calculated for somatization, because of lack of sufficient cases.

There are four noteworthy findings in these co-morbidity statistics. Depression - 29.6% of OCD patients also experienced a major depressive episode and 12.4% experienced dysthymia. Alcohol and drug abuse was experienced by 35.9% and 26.5%, respectively, of OCD patients. Schizophrenia - 11.4% of OCD patients developed schizophrenia at some time in their lives, which is much greater than the non-OCD group. It has been shown that the occurrence of OCD in schizophrenia worsens the prognosis of this disorder (63). Phobias occurred considerably more frequently in those with OCD than in those without OCD, at a rate of 44.7%, compared to 7.8% in those without OCD.

Anorexia has a low co-morbidity rate with OCD at only 0.4%. This is marginally higher than in those without OCD. Somatization was not found to co-exist with OCD. Both these disorders are rare, relative risks are unreliable, and no conclusions should be drawn.

Discussion

There has been a re-awakened interest in OCD since the ECA study challenged previous reports of the rarity of OCD. There has been some emphasis on the need to replicate these data using reliable structured diagnostic instruments. The Edmonton study appears to have achieved this. The results support those from the ECA. OCD is indeed a specific and separate psychiatric disorder, distinguishable by its epidemiological and clinical characteristics.

In summarizing the results of this study, OCD carries a lifetime prevalence of 2.9%. This is in keeping with the 1.9 - 3% of the first three ECA sites (27). The Edmonton six-month prevalence rate is as expected, lower than the lifetime rate, at 1.6%. The ECA studies found it between 1 - 2% (1). In the Edmonton study males tend to have a peak prevalence in middle age and females peak in their late twenties/early thirties. The period prevalence increases with each successive time interval supporting the idea that recurrences of OCD do occur and the length of the illness may span numerous time periods. Recovery is experienced since the one-month prevalence rate has a lower value than those with a longer time interval. Since the one-year recovery rate is 38.7%, this suggests that 61.3% of individuals who have ever had the disorder had symptoms in the year prior to interview. The lifetime morbidity risk of developing OCD is equal for males and females at 5.4%. The most vulnerable age at risk for onset, (by first reported symptom) in this study, in both sexes, is the decade from 10 to 19 years of age. In addition, the risk remains high for the 20-29 year-old group. Most earlier studies cite the mean age of onset to coincide with the 20-25 year-old group. Rasmussen and Tsuang (25) were more specific, finding males to have a mean onset of 15.5 years and females a little later at 22.9 years. The Edmonton study would suggest there may be an onset prior to age 10 but rarely after age 49. Fifty percent of individuals with OCD had developed the illness prior to age 20. Previous authors had noted that 65% of OCD cases developed the illness before age 25.

Turning to the clinical characteristics of OCD, the Edmonton study analyzed the symptoms experienced by OCD individuals. Obsessions were found to be more frequently experienced than compulsions, especially in females. The most common obsession was that of recurrent unpleasant thoughts of harming someone. Obsessions tend to be experienced in either one or other of the two DIS categories with little overlap between categories. Compulsions, on the other hand, were marginally less common but experienced equally by both sexes. Individuals tended to experience compulsions in both DIS categories. It appeared far less common for individuals to experience both obsessions and compulsions simultaneously in this study population, only 16.8% of cases having both. The label obsessive-compulsive disorder may mislead the clinician into thinking this disorder always presents with both obsessive and compulsive features but this appears not to be the case in the majority of OCD sufferers. Perhaps it is more a feature of the severe form of the illness. This may seem to conflict with Rasmussen and Tsuang (64), who found that 83% of their study population experienced cleaning rituals with contamination fears, 73% had checking with somatic obsessions, and 84% had checking with aggressive fears. They also listed aggressive thoughts among the top five most common obsessions. Their list included contamination, sexual and somatic fears, and the need for symmetry. The DIS includes several of these under the same category. At first glance it would appear that the Edmonton sample did not experience multiple obsessions, whereas Rasmussen and Tsuang found this occurred in 60% of cases. While the DIS categories for obsessions (and compulsions) are clinically distinct, within each category multiple obsessions can be experienced. This level of data, however, is not available from the DIS.

The data on compulsions is compatible with the literature where the most common compulsions were checking and counting. Other authors include cleaning (64). The finding of multiple compulsions in the Edmonton study (i.e. overlap between the two categories) is consistent with other studies (18,21).

In the comorbidity data of the Edmonton study, five other psychiatric disorders appeared more prevalent in those with OCD than in the remainder of the population. Notably, depression (and dysthymia), alcohol and drug abuse, phobic disorder, schizophrenia, and antisocial personality, were common. Janet observed that individuals with obsessive-compulsive traits did not have to develop obsessive compulsive neuroses. They could develop depression, somatic syndromes or paranoia. It has since been recognized that not only do obsessive symptoms occur in other psychiatric disorders and in normal mental life, but that OCD patients may be more vulnerable to developing particular psychiatric disorders. In fact, exclusion criteria given in DSM-III state that OCD cannot be secondary to Tourette's Disorder, schizophrenia, major depression or organic mental disorder. DSM-III-R has not included specific exclusion criteria, but states that if another Axis I disorder is present the content of the obsession must be unrelated to it. The Axis I disorders mentioned are major depression, substance abuse, and eating disorder.

OCD appears to share certain features with affective disorders, including: 1) an increased rate of non-suppression on the dexamethasone suppression test in 25-40% (65, 66, 67); 2) shortened REM latency during the sleep EEG (68); 3) a blunted plasma growth hormone response to intravenous Clonidine (69). It may be difficult to determine which Axis I disorder appeared first since in a minority of patients the symptoms of obsessive-compulsive disorder occur concurrently with those of a major depressive disorder. Most patients report the onset of depression after the appearance of the OCD (64). Obsessions can occur as secondary phenomenon in major depression but there appears to be no study which defines the frequency of compulsions in this Axis I disorder. Boyd et al. (70) showed that major depression increases the odds of having OCD by 10 times. It has also been noted that obsessive-compulsive features are rarely, if ever, encountered in mania (64), but in the Edmonton study 5.4% of OCD cases also had a history of mania. According to another study, the chances of having OCD appear to be increased by 18 times in patients with a manic episode (70). Goodwin et al. (40) proposed that "secondary depression is probably the most common complication of OCD" and is the single largest cause of hospitalization of these individuals. In the Edmonton study 29.6% of cases met the DSM-III criteria for a major depressive disorder. This relates closely to the finding of 30% from a clinical study by Rasmussen and Tsuang (64). Other authors have suggested that major depression may occur with OCD 50% of the time (40, 42, 71).

Despite the fact that OCD has been regarded as a neurotic disorder, some authors have commented on its similarities to psychotic states. It has even been described as a variant or prodrome of schizophrenia (6). Numerous follow-up studies have found a relatively high rate of psychosis in patients initially diagnosed with OCD (9, 17-24). It has been proposed that these psychotic features are part of the obsessive-compulsive spectrum. As such, they should be classified in DSM-III-R with the qualifying statement "with psychotic features", as DSM-III-R does for the Mood Disorders. Such cases may not meet the criteria for schizophrenia. In their uncertainty several authors have referred to these patients as "doubtfully schizophrenic" (38, 39). However, there appears to be a minority of OCD patients who do develop schizophrenia, although the incidence is low at 1-3.3% (37, 38, 39). The Edmonton study found this value to be higher at 11.4% but not as high as the lifetime prevalence of OCD in schizophrenic patients, which is 59.2% (72). Other studies have reported that 10% of schizophrenics exhibit obsessive-compulsive symptoms (70, 73, 74). Certainly the presence of obsessive-compulsive features worsens the prognosis of schizophrenia. Such patients have a more chronic course with a higher frequency of social and occupational impairment (63).

It is interesting to note that Janet included in his classification of OCD the syndromes now collectively grouped together as the anxiety disorders (including agoraphobia, panic disorder, simple and social phobia). Modern comorbidity studies support this coexistence of OCD and other anxiety disorders. According to the Boyd et al (70) study, having OCD increases the odds for also having agoraphobia and for simple phobia by 11 and 10 times respectively. In one clinic investigators reported that "many" OCD patients experienced panic disorder (13%) and agoraphobia (9%) (65). There was a "significant" overlap of OCD with simple phobia (27%) and social phobias (18%). This supports the results from the Edmonton study which collectively found as many as 44.7% of OCD patients experienced phobia. Others have reported that 40-50% of OCD patients complain of phobic symptoms (36). There appears to be a high incidence of childhood phobias reported by these patients. Lo (37) found 35% of his OCD patients recalled significant childhood phobias.

Although not included in the present paper, there is another disorder which shares a significant comorbidity with OCD. Tourette's syndrome was included in Janet's original clinical description of OCD. Tics and agitations formed the motor component of the "forced agitations". There appears to be a high incidence of OCD in Tourette's syndrome. Nee et al. (75) found

68% of their Tourette's syndrome patients met the DSM-III criteria for OCD. Similarly, a high frequency of tics are reported in cases of OCD (64).

Another area of overlap occurred with the substance and alcohol abuse disorders. The literature comments on the similarities of self-destructive habits (often referred to as compulsive) and OCD. Included in these are alcoholism and drug abuse. Goodwin et al. (40), in their follow-up study, report "no evidence that obsessional neurosis predisposes to alcoholism or drug addiction". Other authors have found the incidence for both types of abuse to be low in a clinical sample, at 3%. However DSM-III and III-R recognise both as a complication of OCD. In the case of substance abuse this is specific for anxiolytics. This recognition appears to be justified by the results of the present study. In this broader community sample the prevalence in those with OCD was 35.9% for alcohol abuse and 26.5% for drug abuse. Edmonton has a recognized high incidence of alcoholism within the city and this may be partly reflected in this result. However, it could also be that many of these "milder" cases are self medicating rather than seeking medical attention.

According to the Edmonton study there appears to be an increased risk of comorbidity between OCD and antisocial personality disorder (ASP). In this study 10% of OCD patients met the DIS/DSM-III criteria for ASP. This coincides with the findings by Boyd et al. (70) in which the presence of OCD significantly increases the odds of having ASP by 10.1 times ($p < 0.01$), compared to the odds of having ASP in the absence of OCD (70). This conflicts with earlier investigators who have stated "there is no evidence that obsessional neurosis predisposes to homicide, criminal behaviour, alcoholism or drug addiction" (40). Although DSM-III criteria for ASP were not available at the time of the Goodwin et al. study (40), the description given would suggest a profile of ASP. Other investigators have not commented on this association.

One last comment should be made on the relationship of anorexia nervosa and OCD. Often described as a compulsive disorder, these patients present with compulsive vomiting, food-hiding, recurring thoughts of being overweight, and food and exercise rituals. Some authors have suggested anorexia nervosa is a subtype of OCD (76, 77). Age of onset and anankastic premorbid personality are particular to both disorders. In the present study only 0.4% of the OCD patients also met the criteria for anorexia nervosa. Although this was higher than the non-OCD group numbers are too small to draw definitive conclusions.

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