CHAPTER 12

The Phenomenology and Epidemiology of Intermittent Explosive Disorder

Ronald C. Kessler, Emil F. Coccaro, Maurizio Fava, *and* Katie A. McLaughlin

Abstract

Intermittent explosive disorder (IED) is characterized by recurrent episodes of impulsive, uncontrollable aggression out of proportion to the severity of provoking agents. Few epidemiological studies have been carried out on the prevalence and correlates of IED. Data are reported here from the most recent and largest of these studies: the U.S. National Comorbidity Survey Replication (NCS-R) and the World Health Organization World Mental Health (WMH) surveys. These studies show that IED is a commonly occurring disorder that typically has an early age of onset, a persistent course, and strong comorbidity with a number of other usually secondary mental disorders. This disorder is almost twice as common among men as women. It is often associated with substantial distress and impairment. However, only a minority of people with IED obtain treatment for their uncontrollable anger. This combination of features makes IED an ideal target for early detection and intervention aimed at secondary prevention of anger attacks as well as primary prevention of secondary disorders.

Keywords: intermittent explosive disorder, impulse control disorders, aggression, anger, epidemiology, comorbidity

Criteria for a diagnosis of intermittent explosive disorder (IED) in the *Diagnostic and Statistical Manual of Mental Disorder* (4th ed; DSM-IV; American Psychiatric Association, 1994) include the requirement that the patient have recurrent episodes of serious aggression that involve assaultive acts or destruction or property out of proportion to the provocation or to precipitating stressors. The attacks must be characterized by a failure to control aggressive impulses and the inability to be better accounted for by the presence of another mental disorder or by the physiological effects of a substance. Intermittent explosive disorder is the only diagnosis in the DSM-IV that involves impulsive aggression as the core feature. Although a version of the same diagnosis was also included in earlier versions of the DSM, the criteria for the disorder changed so much over time that it is impossible to make reasonable comparisons across studies using the different diagnostic systems (Coccaro, 2000). In DSM-III, for example, IED could not be diagnosed in the presence of generalized aggression or impulsivity that occurred between aggressive episodes, leading to a significant underestimation of prevalence (Coccaro et al., 1998). Although this criterion was dropped from the DSM-IV, other uncertainties about diagnostic thresholds continue to remain, such as the frequency and severity of aggressive acts needed to meet criteria for a diagnosis of IED. The DSM-IV requires "several discrete episodes of failure to resist aggressive impulses that result in serious assaultive acts or destruction of property" without any requirement for temporal clustering of the episodes, but it is unclear whether this is the best threshold. This kind of uncertainty, coupled with the changing diagnostic criteria across successive DSM revisions,

has resulted in a dearth of knowledge about the epidemiology of IED in the general population.

Despite these diagnostic uncertainties, clinical studies of patients who clearly meet diagnostic criteria for IED show them to be characterized by recurrent, impulsive acts of aggression (Coccaro et al., 1998; McCloskey et al., 2006; Posternak & Zimmerman, 2002) and to have high scores on scales of impulsivity (Coccaro et al., 1998) and trait hostility (Coccaro et al., 1998; McCloskey et al., 2006; Posternak & Zimmerman, 2002). Although not required to meet diagnostic criteria for the disorder, patients with IED also report high levels of distress and functional impairment (Coccaro et al., 2004; Fincham et al., 2009; McCloskey et al., 2006; McElroy et al., 1998).

The aggressive acts committed by people with IED often occur in response to interpersonal provocation (Coccaro, 2000; McElroy et al., 1998). Individuals with IED have been found to respond to even minor provocation with aggressive behavior (McCloskey et al., 2006). Indeed, elevated retaliatory aggression in response to provocation may represent a core feature of the disorder. In one study, patients with IED were much more likely than those with other Axis I and Axis II disorders and those without a mental disorder to respond to provocation with extreme aggression in a laboratory-based behavioral task but not to differ in aggressive behavior from others in situations that did not involve provocation (McCloskey et al., 2006). The aggressive acts committed by individuals with IED typically have a rapid onset and are short in duration, most often triggered by provocations from people with whom the individual is acquainted (Coccaro et al., 2004; McElroy et al., 1998).

Patients with IED report that feelings of pent-up tension or distress sometimes increase to a point of explosion just prior to their attacks (McElroy, 1999) and that a sense of release or relief occurs once the attacks occur (McElroy et al., 1998). Although the attacks are sometimes described as being pleasurable when they occur because of the tension release, this is not true in the long term, as they are subsequently associated with remorse. High emotional reactivity, predisposition to aggressive responses to distress, low impulse control, and involuntary control of attention all appear to be involved in these attacks (Coccaro, 2003; Felthous & Barratt, 2003; Koelsch, 2009).

Only a handful of epidemiological studies have examined the prevalence and correlates of IED. The focus of the current report is on data from a large national epidemiological survey carried out in the United States: the National Comorbidity Survey Replication (NCS-R; Kessler & Merikangas, 2004). Some data are also presented from the World Health Organization World Mental Health (WMH) surveys, a series of epidemiological surveys carried out in nine countries that assessed DSM-IV IED. Only two previous surveys had estimated the prevalence of DSM-IV IED (Coccaro et al., 2004; Posternak & Zimmerman, 2002). One of them was a survey of 1300 patients in a university private practice clinic. The point prevalence of IED in that survey was 3.1% (Posternak & Zimmerman, 2002). The second was a study carried out in a nonprobability subsample of 253 respondents in the Baltimore Epidemiologic Catchment Area (ECA) Follow-Up study. The lifetime and 1-month prevalence estimates of IED in that sample were 4.0% and 1.6%, respectively; Coccaro et al., 2004). Retrospective lifetime reports in the second sample suggested that IED has an early age of onset (usually in childhood or adolescence) and a persistent course associated with significant psychosocial impairment and low rates of treatment.

Epidemiological Samples

The NCS-R was a nationally representative, face-to-face household survey (n = 9282) conducted between February 2001 and April 2003 in a multistage clustered area probability sample of the continental United States (Kessler et al., 2003, 2004b). The response rate was 70.9%. Details about the NCS-R design have been reported elsewhere (Kessler et al., 2004b) and will not be repeated here. The WMH surveys were replications and extensions of the NCS-R carried out in a number of other countries throughout the world (Kessler & Üstün, 2008), six of which included an assessment of IED. These six included surveys in Columbia, Iraq, Lebanon, Mexico, the People's Republic of China (PRC), Romania, and Ukraine. A total of 33,180 adults (age 18+) participated across the seven surveys (Table 12.1). All these surveys involved nationally representative household samples except Colombia, which was based on a nationally representative sample of households in urban areas. Weights were used to adjust for differential probabilities of selection within households and to match the samples to population sociodemographic distributions. The weighted average response rate across these surveys was 77.0%, with a range from 70.0% (Lebanon) to 95.2% (Iraq). Further details about the methodology of the WMH surveys are available elsewhere (Heeringa et al., 2008).

Table 12.1 WMH Sample Characteristics in Countries That Assessed IED

Country	Survey[1]	Sample Characteristics[2]	Field Dates	Age Range	Sample Size			Response Rate[4]
					Part I	Part II	Part II and Age ≤ 44[3]	
Colombia	NSMH	Stratified multistage clustered area probability sample of household residents in all urban areas of the country (approximately 73% of the total national population)	2003	18–65	4426	2381	1731	87.7
Iraq	IMHS	Stratified multistage clustered area probability sample of household residents. NR	2007	18+	4332	4332	—	95.2
Lebanon	LEBANON	Stratified multistage clustered area probability sample of household residents. NR	2002–3	18+	2857	1031	595	70.0
PRC	B-WMH S-WMH	Stratified multistage clustered area probability sample of household residents in the Beijing and Shanghai metropolitan areas.	2002–3	18+	5201	1628	570	74.7
Romania	RMHS	Stratified multistage clustered area probability sample of household residents. NR	2005–6	18+	2357	2357	—	70.9
Ukraine	CMDPSD	Stratified multistage clustered area probability sample of household residents. NR	2002	18+	4725	1720	541	78.3
United States	NCS-R	Stratified multistage clustered area probability sample of household residents. NR	2002–3	18+	9282	5692	3197	70.9
Total					**33180**	**19141**	**6634**	

[1]NSMH (The Colombian National Study of Mental Health); IMHS (Iraq Mental Health Survey); LEBANON (Lebanese Evaluation of the Burden of Ailments and Needs of the Nation); B-WMH (The Beijing World Mental Health Survey); S-WMH (The Shanghai World Mental Health Survey); RMHS (Romania Mental Health Survey); CMDPSD (Comorbid Mental Disorders during Periods of Social Disruption); NCS-R (The US National Comorbidity Survey Replication).

[2]Most WMH surveys are based on stratified multistage clustered area probability household samples in which samples of areas equivalent to counties or municipalities in the United States were selected in the first stage followed by one or more subsequent stages of geographic sampling (e.g., towns within counties, blocks within towns, households within blocks) to arrive at a sample of households, in each of which a listing of household members was created and one or two people were selected from this listing to be interviewed. No substitution was allowed when the originally sampled household resident could not be interviewed. These household samples were selected from census area data. In all, 6 of the 10 surveys are based on nationally representative (NR) household samples.

[3]Iraq and Romania did not have an age-restricted Part II sample. All other countries, with the exception of the People's Republic of China and Ukraine (which were age restricted to ≤ 39), were age restricted to ≤ 44.

[4]The response rate is calculated as the ratio of the number of households in which an interview was completed to the number of households originally sampled, excluding from the denominator households known not to be eligible either because of being vacant at the time of initial contact or because the residents were unable to speak the designated languages of the survey. The weighted average response rate is 77.0%.

Diagnostic Assessments

Diagnoses in the NCS-R and WMH surveys were based on Version 3.0 of the World Health Organization Composite International Diagnostic Interview (CIDI; Kessler & Üstün, 2004), a fully structured, lay-administered diagnostic interview that generates diagnoses according to DSM-IV (American Psychiatric Association, 1994) criteria. In addition to IED, the CIDI assessed lifetime and recent prevalence of mood disorders (major depressive disorder or dysthymic disorder, bipolar I-II disorder), anxiety disorders (panic disorder, generalized anxiety disorder, phobias, posttraumatic stress disorder, obsessive-compulsive disorder, separation anxiety disrorder), other impulse control and behavioral disorders (oppositional-defiant disorder, conduct disorder, eating disorders, pathological gambling disorder), and substance disorders (alcohol and drug abuse with or without dependence). As detailed elsewhere (Haro et al., 2006; Kessler et al., 2004a), blind clinical reinterviews using the Structured Clinical Interview for DSM-IV (SCID; First et al., 2002) as the gold standard carried out in a probability subsample of respondents from the NCS-R and several WMH surveys found generally good concordance between DSM-IV diagnoses based on the CIDI and independent diagnoses based on the SCID.

DSM-IV Criterion A for IED requires the occurrence of several episodes of failure to resist the impulse to engage in aggressive behavior that result in serious violent acts or destruction of property. The CIDI operationalized this criterion by requiring the respondent to report at least one of three types of anger attacks: (1) "when all of a sudden you lost control and broke or smashed something worth more than a few dollars"; (2) "when all of a sudden you lost control and threatened to hit or hurt someone", and (3) "when all of a sudden you lost control and hit or tried to hurt someone." Three or more lifetime attacks were required to meet the DSM-IV requirement of "several" attacks. A second, narrower definition of lifetime IED required that three or more attacks occurred in the same year. We defined 12-month prevalence using three successively more stringent requirements. The most inclusive definition required three lifetime attacks and at least one attack in the past 12 months. The intermediate definition required three lifetime attacks in the same year and at least one attack in the past 12 months. The narrowest definition required three attacks in the past 12 months.

DSM-IV Criterion B requires that the aggressive behavior is out of proportion to the provocation or precipitating stressors. This criterion is operationalized in the CIDI by requiring the respondent to report either that he or she "got a lot more angry than most people would have been in the same situation," that the attack occurred "without good reason," or that the attack occurred "in situations where most people would not have had an anger attack." Finally, the CIDI operationalizes Criterion C, requiring that the aggressive behavior is not better accounted for by another mental disorder, the physiological effects of a substance, or a general medical condition by excluding all respondents who either have a lifetime history of bipolar disorder, reported that their anger attacks occurred only when they had been drinking or using drugs or when they were involved in an episode of depression, or reported that their anger attacks were due to organic causes.

Prevalence of Anger Attacks in the United States

Nearly half of all adults in the NCS-R (46.0%) reported experiencing at least one anger attack at some time in their life that involved either destroying property, threatening interpersonal violence, or engaging in interpersonal violence (Table 12.2). Attacks that involved threatening violence were most common (38.8%), followed by attacks that involved actual violence (25.8%) and destroying property (24.5%). A majority of respondents who reported anger attacks (65.9%) had attacks that involved more than one of these three kinds of behavior.

Approximately one-quarter of NCS-R respondents (25.1%) reported having three or more anger attacks in their lifetime. Respondents who reported attacks involving all three types of assaultive behavior represented the most common profile among those with three or more lifetime attacks (35.5%). A smaller proportion of NCS-R respondents reported having three or more lifetime attacks that involved anger out of proportion to the precipitating stressors (15.8%). An even smaller proportion of respondents reported three or more lifetime attacks that both involved disproportionate anger and loss of control (8.5%).

The vast majority (87%) of the NCS-R respondents who reported three or more lifetime attacks that both involved disproportionate anger and loss of control met full lifetime criteria for a broadly defined DSM-IV diagnosis of IED, the others being excluded either because all their attacks occurred as a result of alcohol or drug use, in the context of a

Table 12.2 Lifetime Prevalence of Anger Attack Types and Profiles in the NCS-R (*n* = 9282)

	Prevalence		At Least Three Attacks		At Least Three Attacks and Out of Proportion		At Least Three Attacks and Out of Proportion and Out of Control	
	%[1]	(se)	%[1]	(se)	%[1]	(se)	%[1]	(se)
I. Types								
Broke things	24.5	(0.5)	15.2	(0.4)	11.0	(0.5)	6.5	(0.4)
Threatened people	38.8	(1.1)	21.8	(0.6)	13.6	(0.5)	7.5	(0.4)
Physically attacked people	25.8	(0.8)	14.8	(0.5)	9.6	(0.5)	5.9	(0.4)
Any	46.0	(1.0)	25.1	(0.6)	15.8	(0.5)	8.5	(0.4)
II. Profiles								
Only broke	7.2	(0.3)	3.3	(0.2)	2.2	(0.2)	1.0	(0.1)
Only threatened	8.5	(0.4)	4.1	(0.2)	1.8	(0.1)	0.6	(0.1)
Broke and threatened	4.6	(0.3)	2.9	(0.2)	2.1	(0.2)	1.0	(0.1)
Threatened and attacked	13.0	(0.6)	5.9	(0.3)	2.9	(0.2)	1.4	(0.2)
All three	12.8	(0.5)	8.9	(0.4)	6.7	(0.4)	4.4	(0.3)

[1]Assessed among the NCS-R total Part I sample; that is, in the first row, 24.5% is the percent that broke something among the Part I sample; 15.2% is the percent that broke something *and* at least had three attacks among the total Part I sample, etc.

Table 12.3 Distribution of Lifetime Anger Attacks in the NCS-R (*n* = 9282)

			Mean # of Attacks		Range		Interquartile Range		Total # of Attacks	Distribution of Attacks in the Total Population	
	Prevalence[1]		AVG	(se)	Low Extreme	High Extreme	25.0%	75.0%	(prevalence *mean)	%	(se)
1–2 lifetime attacks	20.8	(0.7)	1.4	(0.0)	1	2	1.0	2.0	(30.1)	4.5	(0.4)
3+ attacks not out of proportion	9.3	(0.4)	16.6	(2.5)	3	500	3.0	10.0	(155.0)	23.4	(3.3)
3+ out-of-proportion attacks not out of control	7.3	(0.3)	20.7	(1.7)	3	500	4.0	10.0	(150.7)	22.7	(2.5)
3+ out-of-proportion/ out-of- control attacks disqualified due to diagnostic hierarchy and/or organic exclusions	1.0	(0.1)	33.3	(8.8)	3	500	4.0	15.0	(34.1)	5.1	(1.5)
Broadly defined IED	7.4	(0.4)	39.4	(4.4)	3	500	5.0	20.0	(292.7)	44.2	(3.0)
Total	46.0	(1.0)	14.4	(1.0)	1	500	1.0	6.0	(662.5)	100.0	(0.0)

[1]Assessed among the NCS-R total Part I sample.

manic or hypomanic or depressive episode, or as a result of an organic cause. The 7.4% of the NCS-R sample with lifetime IED represent only about 16% of all people who reported ever having a lifetime anger attack. However, they account for nearly half (44%) of all anger attacks in the population (Table 12.3). This high percentage is due to the fact that people with IED reported an average of 39.4 lifetime attacks, whereas the majority of other people with anger attacks reported only 1 or 2 lifetime attacks (20.8% of the sample).

Prevalence and Onset of IED in the United States

Lifetime prevalence estimates of broadly and narrowly defined IED (with standard errors in parentheses) in the NCS-R are 7.4% (0.4) and 5.5% (0.3), respectively. Twelve-month prevalence estimates are 4.1% (0.3) using the broad definition, 3.6% (0.3) using the intermediate definition, and 2.8% (0.3) using the narrow definition. Mean age of onset (AOO) of the first anger attack is in early adolescence for both narrowly defined lifetime cases (13.5) and for cases that meet only the broad lifetime definition (broad-only; 14.0; $\chi^2_1 = 2.5$, $p = .12$). The full AOO distributions are also quite similar for narrow and broad-only lifetime cases as well as for males and females of each type (Figure 12.1).

The majority of people with lifetime narrow (67.8%) and broad-only (71.2%) IED have a history of interpersonal violence during their anger attacks, while most others (20.9% narrow, 14.9% broad-only) have a history of threatening interpersonal violence during their attacks. Only a small minority of respondents (11.4% narrow, 13.9% broad-only) reported attacks that never included either interpersonal violence or threats of interpersonal violence.

Lifetime Persistence and Severity of IED in the United States

Narrowly defined lifetime IED in the NCS-R is significantly more persistent than broad-only IED. This can be seen indirectly by calculating the ratios of any 12-month anger attack to the lifetime prevalence estimates reported in the previous section. These ratios are 49.8% (2.7) for narrow and 26.7% (3.6) for broad-only lifetime IED ($z = 5.4$, $p < .001$). Higher persistence of narrow than broad-only cases can be seen more directly by comparing mean number of lifetime attacks (50.6 vs. 6.2; $z = 11.4$, $p < .001$), mean number of years with at least one attack (11.5 vs. 6.2; $z = 6.9$, $p < .001$), and highest number of attacks in a single year (28.6 vs. 1.6; $z = 19.9$, $p < .001$; Table 12.4). Persistence is greatest among respondents whose attacks feature both interpersonal violence and property damage (e.g., an average of 59.7 lifetime attacks versus 24.4–30.2 in other subgroups; $F_{4,620} = 6.8$, $p < .001$).

Narrow cases are also more severe, on average, than broad-only cases, as indicated both by a higher mean monetary value of objects damaged during anger attacks ($1574.30 vs. $443.40; $z = 4.8$, $p < .001$) and by a higher mean number of times someone needed medical attention because of an anger attack (224.0 vs. 36.7 times per 100 cases; $z = 3.4$, $p < .001$). Severity, like persistence, is highest

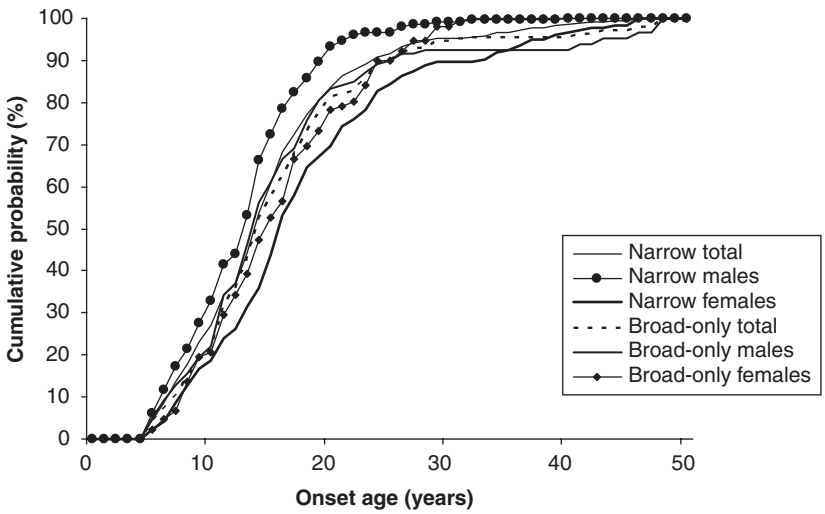

Fig. 12.1 Age of onset distributions of narrow and broad-only lifeline DSM-IV intermittent explosive disorder separately among males ($n = 4139$) and females ($n = 5143$) as well as overall ($n = 9282$).

Table 12.4 Course and Severity of Lifetime DSM-IV/CIDI IED in the NCS-R

	Narrow[1]		Broad–Only[1]		Broad[1]	
	Mean	(se)	Mean	(se)	Mean	(se)
I. Course						
Number of lifetime attacks	50.6*	(6.0)	6.2	(0.4)	39.5	(4.4)
Number of years with attacks	11.5*	(0.5)	6.2	(0.5)	10.2	(0.4)
Highest number of annual attacks	28.6*	(4.3)	1.6	(0.0)	21.8	(3.0)
II. Severity						
Property damage ($)[2]	1574.3	(135.6)	443.4	(132.6)	1340.7	(109.9)
Medical attention (per 100 cases)[3]	224.0	(49.6)	36.7	(12.8)	176.7	(36.8)
(*n*)	(502)		(178)		(680)	

*Significant difference in means between the narrow and broad-only subsamples at the .05 level, two-sided test.
[1]Narrow = three or more annual attacks in at least 1 year of life; Broad-only = three or more lifetime attacks without ever having as many as three attacks in a single year; Broad = Narrow or Broad-only.
[2]Estimated cost of all the things ever damaged or broken in an anger attack.
[3]Number of times during an anger attack that someone was hurt badly enough to need medical attention per 100 cases of IED.
Source: A version of this table appeared previously in Kessler, R. C., Coccaro, E. F., Fava, M., Jaeger, S., Jin, R., & Walters, E. E. (2006). The prevalence and correlates of DSM-IV Intermittent Explosive Disorder in the National Comorbidity Survey Replication. Archives of General Psychiatry, 63(6), 669–678, © 2006 American Medical Association, Used with permission.

among respondents whose attacks feature both violence and property damage (e.g., an average of $1780 in property damage versus $462–$463 in other subgroups that included property damage; $F_{2,622}$ = 37.6., p < .001; and an average of 180 instances of someone requiring medical attention per 100 cases versus 34–229 in other subgroups that included violence; $F_{2,622}$ = 14.2, p = .001). (More detailed results are available on request.) It is important to note, though, that these differences can be explained by the frequency of attacks. Indeed, the mean value of lifetime property damage *per attack* is actually lower for narrow IED ($31) than for broad-only IED ($72). The same is true for injuries requiring medical attention (4.4 per 100 attacks for narrow IED and 5.9 for broad-only IED).

Twelve-Month Duration and Role Impairment of IED in the United States

The average number of anger attacks in the past year is much higher for 12-month narrow (19.5) than intermediate-only (1.5) or broad-only (1.3) cases ($F_{2,347}$ = 28.1, p <.001; Table 12.5). Similar variation exists in number of weeks with an attack ($F_{2,347}$ = 33.1, p <.001). Severe 12-month role impairment, as assessed by the Sheehan Disability Scales (SDS), in comparison, varies much less across the three 12-month IED subsamples. In fact, the proportion of 12-month cases reporting severe role impairment during the worst month of the year does not differ meaningfully across these subsamples for three of the four SDS domains ($F_{2,347}$ = 0.5–1.6, p = .21–.60). The exception is the domain of interpersonal relationships, where severe impairment is considerably more common for narrow (26.5%) and intermediate-only (18.1%) than broad-only (11.6%) cases ($F_{2,347}$ = 3.7, p = .033).

Sociodemographic Correlates

Statistically significant sociodemographic correlates of broadly defined lifetime IED in the NCS-R include being male, young, "other" race-ethnicity (i.e., not Non-Hispanic Black, Non-Hispanic White, or Hispanic), having low education, never having been married, not retired, not a homemaker, and having low family income (Kessler et al., 2006). The odds ratios (ORs) for these sociodemographic correlates were mostly modest in magnitude (1.5–2.0), with the exception of age (1.6–4.3), where the contrast category of respondents ages 60+ has a very low reported prevalence (2.1%). Investigation of this association in a survival framework showed that the lifetime risk of IED based on retrospective age-of-onset reports was inversely related to the age at interview. One plausible interpretation of this finding is that the prevalence of IED might have increased over time in the United States among people in the age range of the NCS-R.

Table 12.5 Duration and Impairment of 12-Month DSM-IV/CIDI IED in the NCS-R

	Narrow[1]		Intermediate-Only[1]		Broad-Only[1]		Broad[1]	
	Mean/%[2]	(se)	Mean/%[2]	(se)	Mean/%[2]	(se)	Mean/%[2]	(se)
I. Twelve-month persistence								
Number of 12-month attacks	19.5*	(2.4)	1.5	(0.1)	1.3	(0.1)	13.8	(1.7)
Number of weeks with attacks	12.1*	(1.3)	1.3	(0.1)	1.3	(0.1)	8.7	(0.9)
II. Severe role impairment (Sheehan Disability Scales)								
Home	14.2	(2.6)	10.7	(3.9)	4.3	(3.0)	12.2	(1.9)
Work	11.1	(2.4)	11.9	(4.0)	6.8	(3.4)	10.7	(2.1)
Interpersonal	26.5*	(3.7)	18.1	(5.4)	11.6	(4.6)	23.0	(3.2)
Social	22.1	(3.3)	16.8	(4.8)	15.3	(5.0)	20.2	(2.7)
Summary	39.8*	(3.6)	25.2	(5.6)	21.3	(6.4)	34.7	(2.9)
(*n*)	(247)		(75)		(56)		(378)	

*Significant difference in prevalence across the narrow, intermediate-only, and broad-only subsamples at the .05 level, two-sided test.
[1]Narrow = three or more 12-month attacks; Intermediate-only = three or more lifetime attacks in a single year (lifetime narrow) and one or two 12-month attacks; Broad-only = three or more lifetime attacks without ever having more than three in a single year (lifetime broad) and having one or two 12-month attacks; Broad = Narrow or Intermediate-only or Broad-only.
[2]Assessed among the NCS-R total Part I sample. The top two rows (number of 12-month attacks, number of weeks with attacks) are continuous variables, and the means and standard error are displayed. The final five rows are dichotomous variables, and the percent and standard error are displayed.
Source: A version of this table appeared previously in Kessler, R. C., Coccaro, E. F., Fava, M., Jaeger, S., Jin, R., & Walters, E. E. (2006). The prevalence and correlates of DSM-IV Intermittent Explosive Disorder in the National Comorbidity Survey Replication. *Archives of General Psychiatry, (63*)6, 669–678. © 2006 American Medical Association. Used with permission.

Another possibility, though, is that older NCS-R respondents underreported their IED more than younger respondents. If this is the case, though, then the prevalence of IED is substantially underestimated in the NCS-R, as the reported prevalence among respondents in the age range 18–29 is 12.2%. In either case, this result suggests that IED is a considerably larger problem than implied by the total-sample prevalence estimate.

Gender is of special interest in light of broader evidence that males have a higher risk than females of impulsive aggression (Struber et al., 2008). We found, consistent with this evidence, that males have a significantly higher odds of lifetime IED than females (OR 1.7, 95% CI 1.4–2.0). This difference is driven entirely, though, by the fact that males are more likely than females to have at least one anger attack ever in their life (OR 1.6, 95% CI 1.5–1.8). Among respondents who reported at least one lifetime anger attack, though, there were no gender differences in progression to three or more attacks or to attacks that were out of control. However, males with IED reported that their attacks were more severe than those of females with IED in terms of extent of property damage, physical damage, and subjectively reported role impairment.

Among NCS-R respondents who met broadly defined lifetime criteria for IED, none of the sociodemographic variables considered in our analysis, including gender, distinguished narrowly defined cases from other broadly defined cases. Nor were any significant sociodemographic correlates found for 12-month persistence among lifetime cases. These results, taken together with the fact that the sociodemographic ORs predicting broadly defined lifetime IED were all quite modest in magnitude, suggests that IED is widely distributed throughout the U.S. population.

Comorbidity of IED with Other DSM Disorders in the United States

The vast majority (81.9%) of respondents with lifetime broadly defined IED in the NCS-R met criteria for at least one of the other lifetime DSM-IV disorders assessed in the NCS-R (Table 12.6). Indeed, broadly defined lifetime IED was significantly and positively related to each of these other disorders after controlling for age, sex, and

race-ethnicity, with ORs in the range 2.2–4.0. The ORs involving narrowly defined IED were consistently higher than those involving other broadly defined cases of IED, but the ratios of these two ORs are elevated only modestly with mood disorders (1.2–1.3) and most anxiety disorders (1.0–1.8). The ratios are more substantially elevated, in comparison, with specific phobia (1.6) and generalized anxiety disorder (2.0), all the impulse control disorders (2.0–2.6), and alcohol abuse (2.7).

We also examined comorbidity of 12-month IED with other 12-month DSM-IV disorders among respondents with a lifetime history of both disorders in the pair. Sparse data made it necessary to focus on broad disorder classes (i.e., any mood disorder, any anxiety disorder, any substance use disorder). As with lifetime comorbidity, ORs involving broadly defined IED were meaningfully elevated (mood 2.7, anxiety 2.2, substance 2.2), while ORs involving intermediate and narrowly defined 12-month cases were generally similar in magnitude to those of broadly defined IED.

Gender differences in comorbidity of broadly defined IED with other disorders were found to be significant but to differ by type of disorder. Associations of IED with impulse control and substance use disorders were significantly stronger among males than females (OR 1.8, 95% CI 1.2–2.6 for impulse control disorders; OR 1.8, 95% CI 1.3–2.4 for substance disorders). Associations of IED with anxiety and mood disorders, in comparison, were significantly weaker among males than females (OR 0.5, 95% CI 0.3–0.7 for anxiety disorders; OR 0.4, 95% CI 0–3-0.6 for mood disorders).

Treatment of IED in the United States

Although roughly two-thirds of respondents with broad lifetime IED received lifetime treatment for emotional problems, only a minority (28.8%) were ever treated specifically for IED (Kessler et al., 2006). The probability of receiving treatment overall as well as within particular services sectors did not differ significantly, depending on the breadth of diagnostic criteria. One-third (33.6%) of respondents with broadly defined 12-month IED received treatment for emotional problems in the year before the interview, but only one-third of that number (11.7% of all 12-month cases) received treatment specifically for IED. As with lifetime treatment, probabilities of overall and sector-specific 12-month treatment did not differ significantly across cases that met broad, intermediate, or narrow diagnostic criteria.

Table 12.6 Lifetime Comorbidity of DSM-IV/CIDI IED with Other DSM-IV/CIDI Disorders in the NCS-R

	Broad[1]				Narrow[1]: Broad-Only[1,2]			
	%[3]	(se)	OR[4]	(95% CI)	%[5]	(se)	OR[6]	(95% CI)
I. Mood disorders								
Major depressive disorder	37.6	(2.2)	3.0*	(2.4–3.6)	38.3	(2.6)	1.2	(0.7–2.0)
Dysthymia	9.8	(1.5)	3.3*	(2.4–4.5)	10.2	(1.7)	1.3	(0.7–2.6)
Any mood disorder	37.8	(2.1)	2.9*	(2.4–3.6)	38.5	(2.6)	1.2	(0.7–2.0)
II. Anxiety disorders								
Agoraphobia	6.5	(1.1)	3.5*	(2.3–5.2)	6.7	(1.3)	1.3	(0.6–3.0)
Generalized anxiety disorder	18.7	(1.8)	3.7*	(2.9–4.8)	20.6	(2.3)	2.0*	(1.3–3.1)
Obsessive compulsive disorder	6.3	(1.9)	2.7*	(1.4–5.2)	6.4	(2.4)	1.4	(0.3–7.3)
Panic disorder	11.7	(1.5)	3.3*	(2.3–4.7)	12.4	(1.7)	1.4	(0.8–2.6)
Post-traumatic stress disorder	15.2	(1.5)	3.1*	(2.3–4.2)	16.6	(2.0)	1.8	(1.0–3.2)
Social phobia	28.0	(1.5)	3.1*	(2.6–3.7)	28.9	(1.8)	1.3	(0.8–1.9)
Specific phobia	24.3	(1.7)	2.6*	(2.2–3.1)	26.2	(2.2)	1.6*	(1.0–2.5)
Separation anxiety disorder	10.5	(1.1)	3.0*	(2.2–4.0)	10.5	(1.4)	1.0	(0.5–1.8)
Any anxiety disorder	58.2	(1.8)	3.9*	(3.2–4.7)	60.3	(2.3)	1.5	(1.0–2.2)

(*continued*)

Table 12.6 Lifetime Comorbidity of DSM-IV/CIDI IED with Other DSM-IV/CIDI Disorders in the NCS-R (*continued*)

	Broad[1]				Narrow[1]: Broad-Only[1,2]			
	%[3]	(se)	OR[4]	(95% CI)	%[5]	(se)	OR[6]	(95% CI)
III. Impulse-control disorders								
Oppositional defiant disorder	24.9	(2.2)	3.5*	(2.6–4.7)	27.8	(2.8)	2.0*	(1.1–3.6)
Conduct disorder	24.5	(2.5)	3.6*	(2.8–4.7)	27.5	(3.1)	2.1*	(1.2–3.7)
Attention-deficit/hyperactivity disorder	19.5	(2.0)	3.3*	(2.5–4.3)	22.3	(2.6)	2.6*	(1.4–4.9)
Any impulse-control disorder	45.1	(2.1)	4.1*	(3.3–5.1)	49.7	(2.7)	2.2*	(1.3–3.7)
IV. Substance use disorders								
Alcohol abuse	32.8	(3.0)	3.1*	(2.3–4.2)	37.4	(3.8)	2.7*	(1.7–4.2)
Alcohol dependence with abuse	17.0	(2.0)	3.6*	(2.6–5.1)	18.5	(2.5)	1.7	(1.0–2.8)
Drug abuse	21.7	(2.3)	2.7*	(2.0–3.7)	23.5	(3.1)	1.5	(0.9–2.7)
Drug dependence with abuse	10.6	(1.4)	3.5*	(2.4–5.2)	11.4	(1.8)	1.5	(0.7–3.2)
Any substance disorder	34.9	(3.0)	2.9*	(2.2–4.0)	39.3	(3.7)	2.4*	(1.6–3.8)
V. Any disorder								
At least one disorder	81.9	(2.0)	5.7*	(4.3–7.7)	84.4	(2.3)	1.8*	(1.1–3.0)
Exactly one disorder	16.0	(1.4)	0.9	(0.7–1.1)	14.0	(1.4)	0.6*	(0.3–1.0)
Exactly two disorders	17.0	(1.6)	1.8*	(1.4–2.4)	16.7	(2.1)	0.9	(0.5–1.6)
Three or more disorders	48.8	(2.6)	4.9*	(3.7–6.3)	53.7	(3.2)	2.3*	(1.5–3.6)
(*n*)			(5692)				(627)	

*Significant at the .05 level, two-sided test, controlling for age, sex, and race-ethnicity.

[1]Narrow = three or more annual attacks in at least 1 year of life; Broad-only = three or more lifetime attacks without ever having as many as three attacks in a single year; Broad = Narrow or Broad-only.

[2]Narrow: Broad-only = comparing lifetime Narrow to lifetime Broad-only by restricting the sample to cases with lifetime Narrow or lifetime Broad-only and treating lifetime Broad-only as the reference category.

[3]Prevalence of the row variables among the column variables. For example, in the first row, there are 37.6% of people with lifetime broad IED with major depressive disorder, and there are 29.3% of males with lifetime broad IED with major depressive disorder.

[4]Bivariate logistic regression models controlling for age, sex, and race-ethnicity to predict the comorbidity of lifetime broad IED with other DSM-IV disorders.

[5]Prevalence of the row variables among lifetime Narrow IED. For example, in the first row, there are 38.3% of people with lifetime Narrow IED with major depressive disorder, and there are 31.4% of males with lifetime Narrow IED with major depressive disorder.

[6]Bivariate logistic regression models controlling for age, sex, and race-ethnicity to predict the comorbidity of lifetime Narrow IED with other DSM-IV disorders. The subsample is restricted to cases with either lifetime Narrow IED or lifetime Broad IED; lifetime Broad IED is the left-out category.

Source: A version of this table appeared previously in Kessler, R. C., Coccaro, E. F., Fava, M., Jaeger, S., Jin, R., & Walters, E. E. (2006). The prevalence and correlates of DSM-IV Intermittent Explosive Disorder in the National Comorbidity Survey Replication. *Archives of General Psychiatry* (63)6, 669–678

Cross-national Prevalence of IED

Lifetime and 12-month prevalence were assessed only for broadly defined IED in the WMH surveys other than in the United States. Lifetime prevalence estimates ranged from a low of 1.3% in Romania to a high of 4.7% in Colombia (Table 12.7). These estimates indicate considerable variability in the cross-national lifetime prevalence of IED. The lifetime prevalence estimate is higher in the United States (7.4%) than in any of the other WMH countries, although estimates in Colombia and Ukraine are closer to the U.S. estimate. The estimates in the remaining WMH countries are less than half of those in the United States. Less cross-national variability

Table 12.7 Estimated Prevalence and Median Age of Onset of Broadly Defined DSM-IV/CIDI IED in the WMH Surveys

	Lifetime Prevalence		Median Age of Onset (years)	12-Month Prevalence		Ratio 12 Month to Lifetime
	%	(se)		%	(se)	
Colombia[1]	4.7	(0.4)	19	2.9	(0.3)	0.62
Iraq[2]	1.7	(0.2)	19	1.5	(0.2)	0.88
Lebanon[3]	1.7	(0.5)	—	0.8	(0.2)	0.47
PRC BJ/SH[4]	1.9	(0.3)	15	1.2	(0.2)	0.63
Romania	1.3[5]	(0.3)[5]	—	1.3[6]	(0.3)[6]	0.99
Ukraine[7]	4.3	(0.3)	21	2.8	(0.3)	0.65
United States[8]	7.4	(0.4)	14	4.1	(0.3)	0.55

— Information not available.
[1]*Source*: Posada-Villa et al. (2008).
[2]*Source*: Alhasnawi et al. (2009).
[3]*Source*: Karam et al. (2008).
[4]*Source*: Huang et al. (2008).
[5,6]*Sources*: Florescu et al. (2009a, 2009b).
[7]*Source*: Bromet et al. (2008).
[8]*Source*: Kessler et al. (2008).

was found in 12-month prevalence estimates, which ranged from a low of 0.8% in Lebanon to a high of 2.9% in Colombia.

The ratio of 12-month to lifetime prevalence of IED, a rough indicator of disorder persistence, was higher in all but one of the WMH countries (ratios ranging from 0.62 to 0.99) than in the United States (0.55). The exception was Lebanon (0.47). These findings indicate that although the prevalence of IED is higher in the United States than in the other countries considered here, the disorder may be more persistent outside the United States. The AOO of IED was examined in four WMH countries (Colombia, Iraq, Beijing-Shanghai, and Ukraine). Median AOO was very similar to the U.S. estimates in all of these countries, with the earliest median in Beijing-Shanghai (age 15) and the latest in Ukraine (age 21).

Discussion

The findings reported here based on national epidemiological surveys from the United States and six other countries document that DSM-IV IED is a relatively common disorder, especially among young adults in the United States. No data are yet available from the other WMH surveys regarding age-related differences in IED prevalence to indicate if the evidence of a dramatically increasing prevalence among young people in the United States exists as well in other countries. The U.S. prevalence estimates are equivalent to 11.5–16.0 million lifetime cases and 5.9–8.5 million 12-month cases, depending on whether we use broad or narrow criteria. These prevalence estimates are somewhat higher than those found in the two previously published U.S. studies of DSM-IV IED, although neither of those earlier studies was based on a national sample (Coccaro et al., 2004; Posternak & Zimmerman, 2002). The WMH estimates indicate that the prevalence of IED varies substantially across countries, although the narrower range of estimates for 12-month than lifetime prevalence raises a question about lifetime recall bias that needs to be examined in future investigations. This pattern again suggests that a focus on younger people, in whom recall bias is likely to be less pronounced, would be valuable.

As noted earlier, the finding of a higher IED prevalence among males than females is consistent with broader evidence that impulsive aggression is more common among males than females (Struber et al., 2008). This result needs to be interpreted with caution because the only previous study of IED in a community-based sample found no significant gender difference in the lifetime prevalence of the disorder (Coccaro et al., 2004). Prior work involving clinical samples also failed to find a gender difference in the prevalence of IED (Coccaro et al., 1998, 2005). The other sociodemographic correlates

of IED found here involving disadvantaged social status (i.e., low education and income, never married), though, are consistent with those found in previous studies (Coccaro, 2003). The strong inverse association with age is especially noteworthy because it indicates either that the prevalence of IED has been on the rise in recent cohorts or that sample selection bias or recall bias led to an underestimation of lifetime prevalence among older respondents. These possibilities both suggest that the lifetime prevalence of IED in current cohorts is likely to be considerably higher in recent cohorts than in the total sample.

A number of important issues remain unresolved regarding the diagnosis of IED. The first of these issues relates to the distinction between broad and narrow definitions of IED. The stipulation in DSM-IV that the presence of only three serious lifetime episodes of aggression may be sufficient to make the diagnosis of IED is one of the few instances in which DSM-IV does not have a temporal clustering requirement (e.g., three episodes in 1 year). It is noteworthy in this regard that even though the most severe form of IED in our study (narrow) is much more persistent than the less severe form (broad), the two did not differ significantly in most measures of functional impairment in the NCS-R. As such, these data raise questions as to when to treat individuals with IED. Prospective treatment data will be needed to resolve this uncertainty.

A second diagnostic issue involves the types of aggressive behaviors that should be included in Criterion A of the IED diagnosis. An alternative set of diagnostic criteria for IED has been proposed that extends the definition to include recurrent aggressive outbursts that do not include threatened or actual violence, assaultive behavior, or physical force (e.g., verbal aggression against others such as insults or arguments out of proportion to the provocation; Coccaro, 2000; Coccaro et al., 1998). Although such individuals were not included in the NCS-R or WMH analyses, other research has shown that such individuals have levels of anger, hostility, aggressive responses to provocation, and functional impairment equivalent to those of individuals who meet full DSM-IV criteria for IED (McCloskey et al., 2008). The Baltimore ECA study findings suggest that IED prevalence would have been roughly 25% higher if cases had been identified using these alternative criteria for IED (Coccaro et al., 1998). Because verbal aggression against others in the absence of threats, physical violence, or property destruction is significantly impairing and has been shown to respond to psychopharmacological treatment (Coccaro et al., 2009), a rationale exists for including these behaviors in the definition of IED in DSM-V. In addition, at least two recent studies demonstrate that individuals who meet criteria for IED based on a modified criterion set (Integrated Research Criteria) that includes these nonassaultive/nondestructive behaviors have greater serotonergic dysfunction compared to individuals defined by DSM-IV criteria (Coccaro et al., 2010a, 2010b).

Another diagnostic issue concerns whether IED is sufficiently distinct from other mental disorders to warrant inclusion as a separate diagnostic entity in the DSM. The NCS-R results indicate substantial rates of comorbidity between IED and other Axis I and Axis II mental disorders. This is consistent with findings from a number of previous studies of IED in clinical samples (Coccaro et al., 1998; Fincham et al., 2009; McCloskey et al., 2006). Moreover, acts of impulsive aggression occur in a wide range of mental disorders other than IED, including substance use disorders and a number of personality disorders (Berman et al., 1998; Critchfield et al., 2008; Eronen et al., 1996; Fals-Stewart et al., 2005; Swanson et al., 1990). Aggressive behavior is a core feature of several mental disorders other than IED, including oppositional defiant disorder and conduct disorder in children and adolescents and antisocial personality disorder in adults (Fals-Stewart et al., 2005; Goldstein et al., 2006; Matthys et al., 1999; Schaeffer et al., 2003). Together, these findings raise questions about whether IED should be classified as a distinct mental disorder.

It is relevant in this regard that recent evidence from a taxometric analysis carried out in the Collaborative Psychiatric Epidemiological Surveys (CPES) indicated that IED is best characterized as taxonic (i.e., categorical rather than dimensional) and is distinguishable from nonpathological aggression and both antisocial and borderline personality disorders (Ahmed et al., 2010). The IED taxon was characterized by frequent anger attacks that were disproportionate to the provocation and involved both loss of control and negative social consequences. These findings suggest that IED represents a valid diagnostic category that is distinct from other disorders involving impulsivity and aggression. The base rate of IED in the population was estimated at 5.5% in the CPES study, which is identical to the lifetime prevalence of narrow IED documented in the NCS-R.

The NCS-R data are quite clear in showing that IED typically begins in adolescence, is associated

with substantial role impairment, and is highly comorbid with other DSM-IV mood, anxiety, and substance use disorders. Although these results cannot be compared directly with the results of clinical studies, it is worth noting that similar patterns have consistently been found in clinical studies of IED (Coccaro, 2000; Coccaro et al., 1998; Felthous et al., 1991; Lejoyeux et al., 1999; Monopolis & Lion, 1983; Zimmerman & Mattia, 2000). This greater severity, combined with the evidence of a relatively higher prevalence, argues that IED is an important disorder that has been comparatively neglected in epidemiological research.

The finding that IED typically begins in adolescence emerged consistently across the five countries where age of onset was retrospectively studied in the WMH series, as did the finding that IED is quite persistent over the life course. It is important to note, though, that this high persistence could have been overestimated to the extent that earlier lifetime prevalence was underreported by older respondents. If the latter was the case, the true lifetime prevalence would be higher than estimated here, while the true persistence would be lower than estimated here. There is no definitive way to adjudicate between these possibilities with the cross-sectional data available to us in the NCS-R and other WMH surveys.

The early age of onset of IED is an important finding with regard to comorbidity because it means that IED is temporally primary to many of the other DSM-IV disorders with which it is comorbid (Coccaro, 2003). This raises the possibility that IED might be either a risk factor or a risk marker for temporally secondary comorbid disorders (Kraemer et al., 1997). Consistent with this possibility, a recent family study showed that the children of depressed adults with anger attacks have higher rates of delinquency and aggressive behavior than the children of depressed adults without anger attacks (Alpert et al., 2003). This suggests that intermittent explosive behavior might emerge quite early in subjects at risk of the subsequent onset of mood disorders. However, we are aware of no systematic research on the possibility that IED is a risk marker for temporally secondary disorders. It is interesting to note in this regard that the one published study that examined the family aggregation of IED found high intergenerational continuity of the disorder independent of comorbid conditions (Coccaro, 2010), which means that common genetic factors are unlikely to account for the comorbidity of IED with other DSM disorders.

This last observation suggests that the association of IED with the later first onset of secondary comorbid disorders is unlikely to be due to common underlying genetic risk factors or to phenotypic factors that are under strong genetic control, such as an impulsive personality style. If IED is a causal risk factor, in comparison, it might promote secondary disorders by leading to divorce, financial difficulties, and stressful life experiences that promote secondary disorders. If this last scenario is correct, then the fact that so few people obtain treatment for IED becomes especially important because it means that an opportunity is being missed to intervene in the disorder at a point in time when it might still be possible to prevent the onset of secondary disorders. A related question for future research is whether successful early detection, outreach, and treatment of IED would help prevent the onset of secondary comorbid disorders. Given the age of onset distribution of IED, early detection would most reasonably take place in schools and might well be an important addition to ongoing school-based violence prevention programs (Flay et al., 2004; Meyer et al., 2004).

It is noteworthy that a detailed analysis of delays in seeking treatment for IED found that the minority of people with IED who obtain professional help for their anger attacks typically wait a decade or more after onset before first treatment contact (Wang et al., 2005). Given the differences in the typical age of onset of IED compared to temporally secondary comorbid disorders (Kessler et al., 2005), this means that initial treatment usually occurs only after the onset of most temporally secondary disorders and that the focus of treatment is probably on the comorbid disorders. This interpretation is consistent with the finding that the majority of people with IED were found to receive treatment for emotional problems at some time in their life, but not for their anger. It is not clear from this result whether the low rate of treatment of anger is due to greater reluctance to seek professional help for anger than other emotional problems or due to failure to conceptualize anger as a mental health problem. Given that so many people with IED obtain treatment for other emotional problems, the question can also be raised concerning why treating clinicians do not include anger as a focus of their treatment or whether the anger problems of their patients with IED are not recognized. We have no data in the NCS-R to adjudicate among these possibilities.

Acknowledgments

Portions of this chapter appeared previously in Kessler, R. C., Coccaro, E. F., Fava, M., Jaeger, S., Jin, R., & Walters, E. E. (2006). The prevalence and correlates of DSM-IV Intermittent Explosive Disorder in the National Comorbidity Survey Replication. *Archives of General Psychiatry,* 63(6), 669–678, © 2006 American Medical Association, and in Kessler, R. C., Coccaro, E. F., & Fava, M. (2007). The prevalence and correlates of DSM-IV intermittent explosive disorder. *Directions in Psychiatry, 27*(4), 221–229, © 2007 Hatherleigh Company, and are reproduced here with the permission of the publishers. Preparation of this chapter was supported by NIMH Grant (U01-MH60220) with supplemental support from the National Institute on Drug Abuse (NIDA), the Substance Abuse and Mental Health Services Administration (SAMHSA), the Robert Wood Johnson Foundation (RWJF; Grant 044780), and the John W. Alden Trust as part of the activity of the National Comorbidity Survey Replication (NCS-R). A complete list of NCS publications and the full text of all NCS-R instruments can be found at http://www.hcp.med.harvard.edu/ncs. Send correspondence to ncs@hcp.med.harvard.edu. The NCS-R is carried out in conjunction with the World Health Organization World Mental Health (WMH) Survey Initiative. We thank the staff of the WMH Data Collection and Data Analysis Coordination Centres for assistance with instrumentation, fieldwork, and consultation on data analysis. These activities were supported by the National Institute of Mental Health (R01 MH070884), the John D. and Catherine T. MacArthur Foundation, the Pfizer Foundation, the U.S. Public Health Service (R13-MH066849, R01-MH069864, and R01 DA016558), the Fogarty International Center (FIRCA R01-TW006481), the Pan American Health Organization, Eli Lilly and Company, Ortho-McNeil Pharmaceutical, Inc., GlaxoSmith-Kline, and Bristol-Myers Squibb. A complete list of WMH publications can be found at http://www.hcp.med.harvard.edu/wmh/.

References

Ahmed, A. O., Green, B. A., McCloskey, M. S., & Berman, M. E. (2010). Latent structure of intermittent explosive disorder in an epidemiological sample. *Journal of Psychiatric Research, 44*(10), 663–672.

Alhasnawi, S., Sadik, S., Rasheed, M., Baban, A., Al-Alak, M. M., Othman, A. Y., et al. (2009). The prevalence and correlates of DSM-IV disorders in the Iraq Mental Health Survey (IMHS). *World Psychiatry, 8*(2), 97–109.

Alpert, J. E., Petersen, T., Roffi, P. A., Papakostas, G. I., Freed, R., Smith, M. M., et al. (2003). Behavioral and emotional disturbances in the offspring of depressed parents with anger attacks. *Psychotherapy and Psychosomatics, 72*(2), 102–106.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

Berman, M. E., Fallon, A. E., & Coccaro, E. F. (1998). The relationship between personality psychopathology and aggressive behavior in research volunteers. *Journal of Abnormal Psychology, 107*(4), 651–658.

Bromet, E. J., Gluzman, S. F., Tintle, N. L., Paniotto, V. I., Webb, C. P. M., Zakhozha, V., et al. (2008). The state of mental health and alcoholism in the Ukraine. In R. C. Kessler & T. B. Üstün (Eds.), *The WHO World Mental Health Surveys: Global perspectives on the epidemiology of mental disorders* (pp. 431–446). New York: Cambridge University Press.

Coccaro, E. F. (2000). Intermittent explosive disorder. *Current Psychiatry Reports, 2*(1), 67–71.

Coccaro, E. F. (2003). Intermittent explosive disorder. In E. F. Coccaro (Ed.), *Aggression: Psychiatric treatment and assessment* (pp. 149–166). New York: Marcel Dekker.

Coccaro, E. F. (2010). A family history study of intermittent explosive disorder. *Journal of Psychiatric Research, 44*(15), 1101–1105.

Coccaro, E. F., Kavoussi, R. J., Berman, M. E., & Lish, J. D. (1998). Intermittent explosive disorder-revised: Development, reliability, and validity of research criteria. *Comprehensive Psychiatry, 39*(6), 368–376.

Coccaro, E. F., Lee, R., & Kavoussi, R. J. (2009). A double-blind, randomized, placebo-controlled trial of fluoxetine in patients with intermittent explosive disorder. *Journal of Clinical Psychiatry, 70*(5), 653–662.

Coccaro, E. F., Lee, R., & Kavoussi, R. J. (2010a). Aggression, suicidality, and intermittent explosive disorder: Serotonergic correlates in personality disorder and healthy control subjects. *Neuropsychopharmacology, 35*(2), 435–444.

Coccaro, E. F., Lee, R., & Kavoussi, R. J. (2010b). Inverse relationship between numbers of 5-HT transporter binding sites and life history of aggression and intermittent explosive disorder. *Journal of Psychiatric Research, 44*(3), 137–142.

Coccaro, E. F., Posternak, M. A., & Zimmerman, M. (2005). Prevalence and features of intermittent explosive disorder in a clinical setting. *Journal of Clinical Psychiatry, 66*(10), 1221–1227.

Coccaro, E. F., Schmidt, C. A., Samuels, J. F., & Nestadt, G. (2004). Lifetime and 1-month prevalence rates of intermittent explosive disorder in a community sample. *Journal of Clinical Psychiatry, 65*(6), 820–824.

Critchfield, K. L., Levy, K. N., Clarkin, J. F., & Kernberg, O. F. (2008). The relational context of aggression in borderline personality disorder: Using adult attachment style to predict forms of hostility. *Journal of Clinical Psychology, 64*(1), 67–82.

Eronen, M., Hakola, P., & Tiihonen, J. (1996). Mental disorders and homicidal behavior in Finland. *Archives of General Psychiatry, 53*(6), 497–501.

Fals-Stewart, W., Leonard, K. E., & Birchler, G. R. (2005). The occurrence of male-to-female intimate partner violence on days of men's drinking: The moderating effects of antisocial personality disorder. *Journal of Consulting and Clinical Psychology, 73*(2), 239–248.

Felthous, A. R., & Barratt, E. S. (2003). Impulsive aggression. In E. F. Coccaro (Ed.), *Aggression: Psychiatric assessment and treatment* (pp. 123–148). New York: Marcel Dekker.

Felthous, A. R., Bryant, S. G., Wingerter, C. B., & Barratt, E. (1991). The diagnosis of intermittent explosive disorder in violent men. *Bulletin of the American Academy of Psychiatry Law, 19*(1), 71–79.

Fincham, D., Grimsrud, A., Corrigall, J., Williams, D. R., Seedat, S., Stein, D. J., et al. (2009). Intermittent explosive disorder in South Africa: Prevalence, correlates and the role of traumatic exposures. *Psychopathology, 42*(2), 92–98.

First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. W. (2002). *Structured clinical interview for DSM-IV-TR axis I disorders, research version, non-patient edition* (*SCID-I/NP*). New York: Biometrics Research, New York State Psychiatric Institute.

Flay, B. R., Graumlich, S., Segawa, E., Burns, J. L., & Holliday, M. Y. (2004). Effects of 2 prevention programs on high-risk behaviors among African American youth: A randomized trial. *Archives of Pediatric and Adolescent Medicine, 158*(4), 377–384.

Florescu, S., Ciutan, M., Popovici, G., Galaon, M., Ladea, M., & Petukhova, M. (2009a). The Romanian Mental Health Study: Main aspects of lifetime prevalence and service use of DSM-IV disorders [in Romanian]. *Management in Health, 3*, 22–30.

Florescu, S., Moldovan, M., Mihaescu-Pintia, C., Ciutan, M., & Sorel, G. E. (2009b). The Mental Health Study Romania 2007. Prevalence, severity, and treatment of 12-month DSM-IV disorders. *Management in Health, 4*, 23–31.

Goldstein, R. B., Grant, B. F., Ruan, W. J., Smith, S. M., & Saha, T. D. (2006). Antisocial personality disorder with childhood vs. adolescence-onset conduct disorder: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Journal of Nervous and Mental Disease, 194*(9), 667–675.

Haro, J. M., Arbabzadeh-Bouchez, S., Brugha, T. S., de Girolamo, G., Guyer, M. E., Jin, R., et al. (2006). Concordance of the Composite International Diagnostic Interview Version 3.0 (CIDI 3.0) with standardized clinical assessments in the WHO World Mental Health surveys. *International Journal of Methods in Psychiatric Research, 15*(4), 167–180.

Heeringa, S. G., Wells, J. E., Hubbard, F., Mneimneh, Z., Chiu, W. T., & Sampson, N. (2008). Sample designs and sampling procedures. In R. C. Kessler & T. B. Üstün (Eds.), *The WHO World Mental Health Surveys: Global perspectives on the epidemiology of mental disorders* (pp. 14–32). New York: Cambridge University Press.

Huang, Y., Liu, Z., Zhang, M., Shen, Y., Tsang, C. A., He, Y., et al. (2008). Mental disorders and service use in China. In R. C. Kessler & T. B. Üstün (Eds.), *The WHO World Mental Health Surveys: Global perspectives on the epidemiology of mental disorders* (pp. 447–473). New York: Cambridge University Press.

Karam, E. G., Mneimneh, Z. N., Karam, A. N., Fayaad, J. A., Nasser, S. C., Dimassi, H., et al. (2008). Mental disorders and war in Lebanon. In R. C. Kessler & T. B. Üstün (Eds.), *The WHO World Mental Health Surveys: Global perspectives on the epidemiology of mental disorders* (pp. 265–278). New York: Cambridge University Press.

Kessler, R. C., Abelson, J., Demler, O., Escobar, J. I., Gibbon, M., Guyer, M. E., et al. (2004a). Clinical calibration of DSM-IV diagnoses in the World Mental Health (WMH) version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *International Journal of Methods in Psychiatric Research, 13*(2), 122–139.

Kessler, R. C., Berglund, P. A., Chiu, W. T., Demler, O., Glantz, M., Lane, M. C., et al. (2008). The National Comorbidity Survey Replication (NCS-R): Cornerstone in improving mental health and mental health care in the United States. In R. C. Kessler & T. B. Üstün (Eds.), *The WHO World Mental Health Surveys: Global perspectives on the epidemiology of mental disorders* (pp. 165–210). New York: Cambridge University Press.

Kessler, R. C., Berglund, P., Chiu, W. T., Demler, O., Heeringa, S., Hiripi, E., et al. (2004b). The U.S. National Comorbidity Survey Replication (NCS-R): Design and field procedures. *International Journal of Methods in Psychiatric Research, 13*(2), 69–92.

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Koretz, D., Merikangas, K. R., et al. (2003). The epidemiology of major depressive disorder: Results from the National Comorbidity Survey Replication (NCS-R). *Journal of the American Medical Association, 289*(23), 3095–3105.

Kessler, R. C., Berglund, P. A., Demler, O., Jin, R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication (NCS-R). *Archives of General Psychiatry, 62*(6), 593–602.

Kessler, R. C., Coccaro, E. F., Fava, M., Jaeger, S., Jin, R., & Walters, E. (2006). The prevalence and correlates of DSM-IV intermittent explosive disorder in the National Comorbidity Survey Replication. *Archives of General Psychiatry, 63*(6), 669–678.

Kessler, R. C., & Merikangas, K. R. (2004). The National Comorbidity Survey Replication (NCS-R): Background and aims. *International Journal of Methods in Psychiatric Research, 13*(2), 60–68.

Kessler, R. C., & Üstün, T. B. (2004). The World Mental Health (WMH) Survey Initiative Version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *International Journal of Methods in Psychiatric Research, 13*(2), 93–121.

Kessler, R. C., & Üstün, T. B. (Eds.). (2008). *The WHO World Mental Health Surveys: Global perspectives on the epidemiology of mental disorders*. New York: Cambridge University Press.

Koelsch, S. (2009). P3a and mismatch negativity in individuals with moderate intermittent explosive disorder. *Neuroscience Letters, 460*(1), 21–26.

Kraemer, H. C., Kazdin, A. E., Offord, D. R., Kessler, R. C., Jensen, P. S., & Kupfer, D. J. (1997). Coming to terms with the terms of risk. *Archives of General Psychiatry, 54*(4), 337–343.

Lejoyeux, M., Feuche, N., Loi, S., Solomon, J., & Ades, J. (1999). Study of impulse-control disorders among alcohol-dependent patients. *Journal of Clinical Psychiatry, 60*(5), 302–305.

Matthys, W., Cuperus, J. M., & Van Engeland, H. (1999). Deficient social problem-solving in boys with ODD/CD, with ADHD, and with both disorders. *Journal of the American Academy of Child and Adolescent Psychiatry, 38*(3), 311–321.

McCloskey, M. S., Berman, M. E., Noblett, K. L., & Coccaro, E. F. (2006). Intermittent explosive disorder–integrated research diagnostic criteria: Convergent and discriminant validity. *Journal of Psychiatric Research, 40*(3), 231–242.

McCloskey, M. S., Lee, R., Berman, M. E., Noblett, K. L., & Coccaro, E. F. (2008). The relationship between impulsive verbal aggression and intermittent explosive disorder. *Aggressive Behavior, 34*(1), 51–60.

McElroy, S. L. (1999). Recognition and treatment of DSM-IV intermittent explosive disorder. *Journal of Clinical Psychiatry, 60*(Suppl 15), 12–16.

McElroy, S. L., Soutullo, C. A., Beckman, D. A., Taylor, P., Jr., & Keck, P. E., Jr. (1998). DSM-IV intermittent explosive disorder: A report of 27 cases. *Journal of Clinical Psychiatry, 59*(4), 203–210; quiz 211.

Meyer, G., Roberto, A. J., Boster, F. J., & Roberto, H. L. (2004). Assessing the Get Real about Violence curriculum: Process and outcome evaluation results and implications. *Health Communication, 16*(4), 451–474.

Monopolis, S., & Lion, J. R. (1983). Problems in the diagnosis of intermittent explosive disorder. *American Journal of Psychiatry, 140*(9), 1200–1202.

Posada-Villa, J., Rodriguez, M., Duque, P., Garzon, A., Aguilar-Gaxiola, S., & Breslau, J. (2008). Mental disorders in Columbia: Results from the World Mental Health Survey. In R. C. Kessler & T. B. Üstün (Eds.), *The WHO World Mental Health Surveys: Global perspectives on the epidemiology of mental disorders* (pp. 131–143). New York: Cambridge University Press.

Posternak, M. A., & Zimmerman, M. (2002). Anger and aggression in psychiatric outpatients. *Journal of Clinical Psychiatry, 63*(8), 665–672.

Schaeffer, C. M., Petras, H., Ialongo, N., Poduska, J., & Kellam, S. (2003). Modeling growth in boys' aggressive behavior across elementary school: Links to later criminal involvement, conduct disorder, and antisocial personality disorder. *Developmental Psychology, 39*(6), 1020–1035.

Struber, D., Luck, M., & Roth, G. (2008). Sex, aggression and impulse control: An integrative account. *Neurocase, 14*(1), 93–121.

Swanson, J. W., Holzer, C. E., 3rd, Ganju, V. K., & Jono, R. T. (1990). Violence and psychiatric disorder in the community: Evidence from the Epidemiologic Catchment Area surveys. *Hospital and Community Psychiatry, 41*(7), 761–770.

Wang, P. S., Berglund, P. A., Kessler, R. C., Olfson, M., Pincus, H. A., & Wells, K. B. (2005). Failure and delay in initial treatment contact after first onset of mental disorders in the National Comorbidity Survey Replication (NCS-R). *Archives of General Psychiatry, 62*(6), 603–613.

Zimmerman, M., & Mattia, J. I. (2000). Principal and additional DSM-IV disorders for which outpatients seek treatment. *Psychiatric Services, 51*(10), 1299–1304.