

The prevalence and correlates of intermittent explosive disorder in Iraq

Al-Hamzawi A, Al-Diwan JK, Al-Hasnawi SM, Taib NI, Chatterji S, Hwang I, Kessler RC, McLaughlin KA. The prevalence and correlates of intermittent explosive disorder (IED) in Iraq.

Objective: Intermittent explosive disorder is common, begins early in life, and is associated with considerable impairment in the United States. The epidemiology of IED outside the United States is unknown. We examined the prevalence and correlates of IED in Iraq, where exposure to violence has been widespread during the last three decades.

Method: Data were drawn from a national survey of the Iraq population, the Iraq Mental Health Survey (IMHS), conducted in 2006–2007. The WHO Composite International Diagnostic interview was used to assess DSM-IV disorders, including IED. The response rate was 95.2%.

Results: Lifetime and 12-month prevalence estimates of IED were 1.7% and 1.5%. Mean age of onset was 18.5. The mean number of lifetime attacks was 141.6 attacks, and IED-related injuries occurred 61 times per 100 lifetime cases. IED was significantly comorbid with mood and anxiety, but not substance, disorders.

Conclusion: Although the prevalence of IED is lower in Iraq than in the United States, the disorder has an early age of onset, is highly persistent, and is associated with substantial comorbidity and functional impairment. Iraq lacks national policies or systematic programmes to reduce aggression, highlighting the importance of implementing violence prevention programmes to reduce the societal burden of violence in Iraq.

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Key words: intermittent explosive disorder; mental illness; prevalence; Iraq; World Mental Health Surveys

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Accepted for publication February 17, 2012

Significant outcomes

- Despite the widespread exposure to war, terrorism, and violence – which are associated strongly with subsequent perpetration of violence – the lifetime prevalence of intermittent explosive disorder (IED) is lower in Iraq than in the United States.
- The clinical features of IED in Iraq are similar to those observed in the United States: IED begins early in life, exhibits a chronic course, and is associated with high rates of comorbidity with other mental disorders and considerable functional impairment.
- Despite the high societal cost of IED, this disorder is understudied and undertreated both in the United States and internationally.

Limitations

- The prevalence of IED in Iraq may be underestimated. The survey was conducted in 2006–2007, while rates of violence in Iraq were quite high, and excluded people who may have been more likely to have IED including displaced people, those who had migrated out of Iraq, and residents of areas deemed too dangerous to complete the survey.
- Virtually, no prior studies have examined the prevalence and features of IED outside the United States. Because we used a survey instrument that was developed in the United States, our assessment may have excluded important symptoms or features of the disorder that are more commonly experienced in Iraq than in the United States.
- IED diagnoses were not validated, because there is no gold standard diagnostic instrument for IED. The development of such instruments represents an important goal for future research.

Introduction

Intermittent explosive disorder (IED) is characterized by recurrent episodes of aggression that involve interpersonal violence or property destruction that are out of proportion to provocation or to precipitating stressors, as defined in the *Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition* (DSM-IV) (1). The attacks must involve a failure to control aggressive impulses and cannot be accounted for by the presence of another mental disorder or by the physiological effects of a substance. IED is the only DSM-IV disorder that involves impulsive aggression as the core feature.

Few studies have examined the prevalence and correlates of IED, and almost all existing studies have been conducted in the United States. The lifetime prevalence of IED was estimated at 4.0% in a non-probability subsample of respondents in the Baltimore Epidemiologic Catchment Area Follow-Up study (2). A survey of patients in a university private practice clinic reported the point prevalence of IED at 3.1%. The only national data on IED were collected in the National Comorbidity Survey Replication (NCS-R) (3). In the NCS-R, IED was defined using a broad and a narrow interpretation of DSM-IV criteria, because the diagnostic thresholds for the frequency, severity, and temporal clustering of anger attacks are not provided in the criteria. Lifetime prevalence of broad and narrow IED was estimated at 7.4% and 5.5% (4). Results from both the ECA and NCS-R surveys suggested that IED has an early age of onset (typically in adolescence) and a persistent course associated with marked psychosocial impairment (2, 4).

The prevalence and correlates of IED outside the United States are largely unknown. The only published study found that exposure to trauma and violence was associated with greater risk for IED in South Africa (5). Because exposure to violence is associated strongly with subsequent perpetration of violence (6–9), the prevalence of IED might reasonably be expected to be higher in countries with high levels of violence.

Aims of the study

We examined the prevalence, course, severity, comorbidity, and sociodemographic correlates of intermittent explosive disorder in Iraq using data from the Iraq Mental Health Survey, a national survey of DSM-IV disorders in Iraq collected as part of the WHO World Mental Health Surveys. Iraqi citizens have been exposed to war, widespread violence, and terrorism during the last three

decades (10–12). As such, we anticipated to find a high prevalence of intermittent explosive disorder in Iraq.

Material and methods

Sample

The IMHS is a nationally representative survey of 4332 adults (18 years+) carried out simultaneously with the Iraq Family Health Survey (IFHS) (13). Both surveys were completed in 2006–2007 under the direction of the Iraq Ministry of Health, the Iraq Central Organization for Statistics and Information Technology (COSIT), the Ministry of Health of the Kurdistan region (MoHK), and the Kurdistan Regional Statistics Office (KRSO). The IFHS and IMHS were administered face-to-face in a sample of the Iraqi household population. The IMHS was administered in the central and southern governorates during August and September 2006, in Anbar during October and November 2006, and in the Kurdistan region during February and March 2007. The IMHS response rate was 95.2%.

The sample for the IMHS was a subset of the block-level sample segments used in the IFHS. Iraq was divided into 55 strata for purposes of selecting this initial sample. Each of the 17 governorates outside of Baghdad was divided into three strata (metropolitan, representing the governorate capital; other urban area outside the capital; and rural area), and Baghdad included five strata (three parts of the city representing Sadar City, Rusafah side, and Al-Karkh side; all other urban areas in the city; and all rural areas outside the city in the metropolitan area). Each stratum was divided into block-level sample segments that were paired for purposes of sample selection. Eighteen such segments (nine pairs) were selected with probabilities proportional to size in each of the 56 population strata. Five households were then selected randomly within each segment, and one adult (ages 18+) was selected using Kish tables for interview within each household. Some segments in the Al-Karkh stratum in Baghdad and in the Anbar and Nineveh governorates were replaced because of security problems. These replacement segments were oversampled in anticipation of low response rates.

As the sampling frame was based on administrative data, a new household listing was carried out before selecting households in each segment. The measures of segment size were modified based on this new enumeration and the data weighted to adjust for discrepancies between expected and

observed numbers of households. An additional weight was used to adjust for differential probability of household selection across strata and for differential probability of within-household selection as a function of number of household adults. Finally, a poststratification weight was applied to the data to match the joint distribution of the sample on age, gender, and geography to the population distribution.

Measures

Diagnostic assessment. Respondents were administered the Composite International Diagnostic Interview (CIDI), a fully structured interview designed to be administered by trained lay interviewers (14). Lifetime DSM-IV disorders assessed in the CIDI included mood disorders (major depressive disorder, dysthymia, bipolar I and II disorders), anxiety disorders (panic disorder with or without agoraphobia, agoraphobia without panic disorder, social phobia, specific phobia, generalized anxiety disorder, post-traumatic stress disorder, obsessive-compulsive disorder), behaviour disorders [attention deficit hyperactivity disorder (ADHD), IED], and substance disorders (alcohol and drug abuse, alcohol and drug dependence with abuse). All diagnoses were made using DSM-IV organic exclusion rules. All but two diagnoses were made using DSM-IV diagnostic hierarchy rules. The exceptions were alcohol and drug abuse, which were defined with or without dependence.

The CIDI assessed IED based on DSM-IV criteria. Criterion A requires 'several discrete episodes of failure to resist aggressive impulses that result in serious assaultive acts or destruction of property'. This criterion was assessed with questions about three types of anger attacks: i) 'when all of a sudden you lost control and broke or smashed something worth more than a few dollars;' ii) 'when all of a sudden you lost control and hit or tried to hurt someone;' and iii) 'when all of a sudden you lost control and threatened to hit or hurt someone'. To meet this criterion, the respondent was required to report three or more such attacks in their lifetime. We also created a narrow definition of lifetime IED that requires three attacks in the same year. Although this temporal clustering is not required in the DSM-IV criteria, this definition has been used in clinical studies of IED (2) and in epidemiological studies in the United States (4). Three successively more stringent definitions were used to define 12-month IED. The broad definition required three lifetime attacks with at least one attack in the past 12 months. The intermediate definition required three lifetime

attacks in the same year with at least one attack in the past 12 months. The narrow definition required three attacks in the past 12 months.

DSM-IV criterion B for IED requires that the aggression is 'grossly out of proportion to any precipitating psychosocial stressor'. This criterion was operationalized by requiring the respondent to report either that they 'got a lot more angry than most people would have been in the same situation' or that the attack occurred 'without good reason' or that the attack occurred 'in situations where most people would not have had an anger attack'.

DSM-IV criterion C for IED requires that the 'aggressive episodes are not better accounted for by another mental disorder and are not due to the direct physiological effects of a substance or a general medical condition'. This criterion was partially operationalized in the CIDI with a series of questions that determine whether anger attacks occur only in the context of a substance use disorder, depression, or organic causes. Two sets of question asked if anger attacks usually occur either when respondents have been drinking or using drugs or when they are in an episode of being sad or depressed. Positive responses were followed with probes about whether the attacks ever occurred at times when the respondent was not under the influence of alcohol or drugs or was not depressed. If not, the case was not considered because of substance use disorder and/or depression. A third set of questions asked about organic causes as follows: 'Anger attacks can sometimes be caused by physical illnesses such as epilepsy or a head injury or by the use of medications. Were your anger attacks ever caused by physical illness or medications?' Positive responses were followed with probes that inquired about the nature of the illness and/or medication and whether the respondent ever had attacks other than during the course of the illness or under the influence of the medication. If not, the case was considered because of an organic cause.

Although the CIDI did not include parallel questions that excluded respondents whose anger attacks occurred in the course of bipolar disorder (BPD), we made this exclusion based on evidence that IED has a particularly strong relationship with BPD (15–17). We excluded cases from a diagnosis of IED if they met lifetime criteria for mania or hypomania, reported that the ages of onset and recency of their IED fell within the ages of onset and recency of their mania or hypomania, and reported that the number of years they experienced manic or hypomanic episodes was greater than or equal to the number of years they had anger attacks. This rule artificially prevents

any degree of comorbidity between IED and BPD, which we judged to be of less concern than the possibility of overestimating the prevalence of IED by failing to exclude anger attacks because of BPD.

As detailed elsewhere (18), blinded clinical reappraisal interviews with a probability subsample of CIDI respondents in WMH surveys conducted in a number of other countries found generally good concordance between diagnoses based on the CIDI and those based on the Structured Clinical Interview for DSM-IV (SCID) (19). Logistical complexities made it impossible to carry out a clinical reappraisal study in the IMHS.

Persistence and severity

The measures of onset and course were based on retrospective reports about age of onset, number of lifetime attacks, number of years with at least one attack, and questions about attacks in the 12 months before the interview. The assessment of impairment included questions about lifetime impairment and impairment in the past 12 months. The lifetime questions asked about the financial value of all the things the respondent ever broke or damaged during an anger attack and about the number of times either the respondent or someone else had to seek medical attention because of an injury caused by the respondent's anger attacks. The 12-month questions asked the respondent to rate the extent to which his/her IED interfered with his/her life and activities in the worst month of the past year using the Sheehan Disability Scales (SDS) (20). The SDS are 0–10 visual analogue scales that assess how much a focal disorder interferes with home life, school or work, family relationships, and social life using the response options none (0), mild (1–3), moderate (4–6), severe (7–9), and very severe (10).

Sociodemographics

The sociodemographic variables included in analysis were sex, age (18–34, 35–49, 50–64, 65+), education [low (0 years), low-average (1–6 years, no secondary education), high-average (7–12 years, no postsecondary education), and high (13+ years, at least some postsecondary)], marital status (married, previously married, never married), and occupational status (student, homemaker, retired, employed, and other).

Analysis methods

Prevalence was estimated with cross-tabulations. Cumulative lifetime age-of-onset curves were calculated using the actuarial method (21). Associations of IED with sociodemographics and comorbid DSM-IV disorders were examined using logistic regression analysis. Impairment was examined using analysis of variance. Logistic regression coefficients and their standard errors were exponentiated to create odds ratios (ORs) with 95% confidence intervals. Standard errors were estimated using the Taylor series linearization method to account for sample weights and clustering using the SUDAAN software system (22). Statistical significance was evaluated using 0.05-level two-sided tests.

Results

Prevalence of anger attacks

Nearly one in 6 (14.2%) adults in Iraq reported experiencing at least one anger attack at some time in their life that involved either destroying property, threatening violence, or engaging in interpersonal violence (Table 1). Attacks that involved threatening violence were most common (11.0%),

Table 1. Lifetime prevalence of anger attack types and profiles

	Prevalence % (SE)*	At least three attacks % (SE)*	At least three attacks and out of proportion % (SE)*	At least three attacks and out of proportion and out of control % (SE)*
Types				
Broke things	7.4 (0.6)	2.2 (0.3)	1.4 (0.2)	1.3 (0.2)
Threatened people	11.0 (0.7)	3.8 (0.5)	1.6 (0.2)	1.3 (0.2)
Physically attacked people	9.1 (0.6)	3.1 (0.4)	1.4 (0.2)	1.1 (0.2)
Any	14.2 (0.6)	4.8 (0.5)	2.3 (0.3)	1.9 (0.2)
Profiles				
Only broke	3.2 (0.3)	1.0 (0.2)	0.7 (0.1)	0.7 (0.1)
Only threatened	1.5 (0.2)	0.5 (0.2)	0.1 (0.0)	0.1 (0.0)
Broke and threatened	0.4 (0.1)	0.2 (0.1)	0.1 (0.1)	0.1 (0.1)
Threatened and attacked	5.3 (0.3)	2.1 (0.3)	0.8 (0.2)	0.6 (0.1)
All three	3.8 (0.5)	1.0 (0.2)	0.6 (0.1)	0.5 (0.1)

*Assessed in the Part I sample; that is, in the first row, 2.2% represents the proportion of the total Part I sample that broke something and at least had three attacks.

Table 2. Distribution of lifetime anger attacks

	Prevalence % (SE)*	Mean no. of attacks Mean (SE)	Range		Interquartile Range		Total no. of attacks (prevalence*mean)	Distribution of attacks in total population % (SE)
			Low extreme	High extreme	25.00%	75.00%		
1–2 lifetime attacks	9.4 (0.5)	1.3 (0.0)	1	2	1	2	11.7	2.7 (0.5)
3+ attacks not out of proportion	2.5 (0.4)	61.1 (21.6)	3	500	4	26	154.5	35.9 (8.3)
3+ out-of-proportion attacks not out of control	0.3 (0.1)	42.1 (16.9)	3	500	6	50	14.2	3.3 (11.8)
3+ out-of-proportion/out-of-control attacks disqualified owing to diagnostic hierarchy and/or organic exclusions	0.2 (0.1)	18.5 (12.5)	5	500	5	7	3.7	0.9 (0.6)
Broadly defined IED	1.7 (0.2)	141.6 (34.1)	3	500	10	220	245.8	57.2 (5.7)
Total	14.2 (0.6)	30.4 (7.0)	1	500	1	5	429.8	100.0 (0.0)

IED, intermittent explosive disorder.

*Assessed in the Part I sample.

followed by attacks that involved actual violence (9.1%) and destroying property (7.4%). Approximately one-third of respondents with at least one anger attack (4.8%) reported experiencing three or more anger attacks in their lifetime. A smaller proportion of respondents reported three or more lifetime attacks that involved anger out of proportion to provocation (2.3%), and an even smaller proportion reported three or more attacks involving both disproportionate anger and loss of control (1.9%).

The vast majority of respondents who reported three or more lifetime attacks that involved both 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 manic/hypomanic or depressive episode, or as a result of an organic cause. The 1.7% of the sample with lifetime IED represents only about 12% of all individuals who reported ever having a lifetime anger attack. However, they account for more than half (57.2%) of all anger attacks in the population (Table 2). This high percentage is due to the fact that respondents with IED reported an average of 245.8 lifetime attacks.

Prevalence and onset of IED

Lifetime prevalence estimates (standard errors in parentheses) of broadly and narrowly defined IED in Iraq are 1.7% (0.2) and 1.5% (0.2) respectively. Twelve-month prevalence estimates are 1.5% (0.2) using the broad definition, 1.4% (0.2) using the intermediate definition, and 1.1% (0.2) using the narrow definition. Mean age of onset (AOO) of IED is in late adolescence for both narrowly defined (18.5) and broadly defined (18.5) lifetime cases. The full AOO distributions are virtually

identical for narrow- and broad-only lifetime cases (Fig. 1).

Lifetime persistence and severity

Although narrowly defined lifetime IED is significantly more persistent than broadly defined IED, these differences are small in substantive terms. Narrowly defined cases have a greater mean number of lifetime attacks (158.2 vs. 141.6; $F_{1,55} = 9.3, P < 0.001$), mean number of years with at least one attack (9.6 vs. 9.0; $F_{1,55} = 7.2, P = 0.002$), and highest number of attacks in a single year (36.8 vs. 33.0; $F_{1,55} = 12.7, P < 0.001$) (Table 3). However, narrow cases are no more severe, on average, than broad cases. In fact, broad cases have a higher mean monetary value of objects damaged during anger attacks (\$1.8 vs. \$1.6, $\chi^2_1 = 4.1, P = 0.02$). The mean number of times

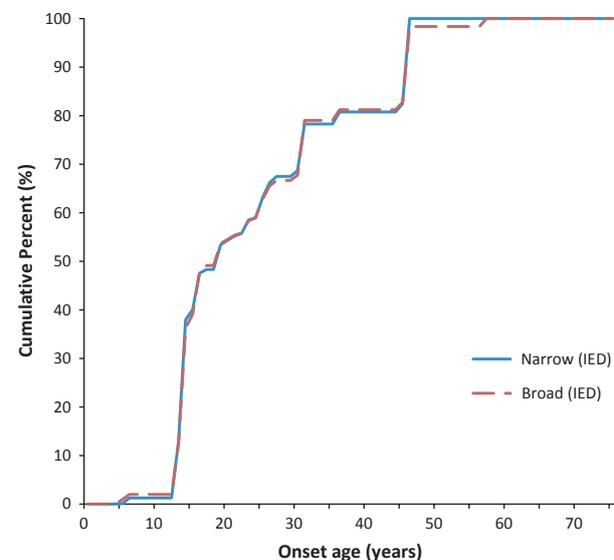


Fig. 1. Age of onset distributions of narrow and broad-only lifetime DSM-IV intermittent explosive disorder ($n = 4332$).

Table 3. Course and severity of lifetime DSM-IV intermittent explosive disorder (IED)

	Narrow† Mean (SE)	Broad† Mean (SE)	Narrow vs. broad‡ <i>F</i> (<i>P</i> -value)
Course			
Number of lifetime attacks	158.2 (39.1)	141.6 (34.1)	9.3 (0.000)*
Number of years with attacks	9.6 (1.7)	9.0 (1.5)	7.2 (0.002)*
Highest number of annual attacks	36.8 (7.8)	33.0 (7.0)	12.7 (<0.0001)*
Severity			
Property damage (\$)§	1.6 (0.2)	1.8 (0.3)	4.1 (0.020)
Medical attention (per 100 cases)¶	60.8 (12.7)	60.3 (13.2)	0.4 (0.660)
<i>n</i> **	65	77	4332

*Significant difference in means at the 0.05 level, two-sided test.

†Narrow = three or more annual attacks in at least 1 year of life; Broad = three or more lifetime attacks.

‡Significance test with bivariate linear regression models to test the difference in mean between narrow and broad cases. No controls were used in these models.

§Estimated cost of all the things ever damaged or broken in an anger attack.

¶Number of times during an anger attack someone was hurt bad enough to need medical attention per 100 cases of IED.

**Number of cases in the subsample. Assessed among total Part I sample.

someone needed medical attention because of an anger attack was not different among narrow as compared to broad cases (60.8 vs. 60.3 times per 100 cases; $\chi^2_1 = 0.4$, $P = 0.66$).

Twelve-month duration and role impairment

The average number of past-year anger attacks is higher for 12-month narrow- (12.9) than for intermediate-only (10.8) or broad-only (10.3) cases ($F_{2,55} = 19.1$, $P < 0.001$) (Table 4). The same pattern exists in number of weeks with an attack ($F_{2,55} = 14.7$, $P < 0.001$). Severe 12-month role impairment, as assessed by SDS, also varies

across the three 12-month IED groups. The proportion of 12-month cases reporting severe role impairment during the worst month of the year varies across IED groups for all four SDS domains ($F_{2,55} = 563.6-995.7$, $P < 0.001$) and for total disability ($F_{2,55} = 1147.9$, $P < 0.001$), such that severe impairment is more common for narrow cases than for intermediate and broadly defined cases.

Sociodemographic correlates

Statistically significant sociodemographic correlates of lifetime IED include age, marital status, and employment (Results available on request). Younger respondents are more likely to have narrow IED (ORs = 1.3–3.2, $\chi^2_3 = 7.6$, $P = 0.05$) than those aged 65 and older. Both narrowly and broadly defined IED are more common among married (OR = 1.8–1.8) and previously married (OR = 2.8–3.2) respondents than among the never married ($\chi^2_2 = 8.9-9.7$, $P = 0.01-0.008$). Non-employed individuals are less likely to have both narrow (OR = 0.3–0.5, $\chi^2_4 = 1260.5$, $P < 0.001$) and broad IED (OR = 0.1–0.6, $\chi^2_4 = 12.1$, $P = 0.02$).

Comorbidity

The majority of respondents with broad (61.2%) and narrow (61.6%) lifetime IED meet criteria for at least one additional lifetime DSM-IV disorder (Table 5). Broad lifetime IED is significantly and positively related to lifetime mood (OR = 4.1; $\chi^2_1 = 14.8$, $P < 0.001$) and anxiety (OR = 8.6;

Table 4. Duration and impairment of 12-month DSM-IV intermittent explosive disorder

	Narrow† Mean/%‡ (SE)	Intermediate† Mean/%‡ (SE)	Broad† Mean/%‡ (SE)	Narrow vs. intermediate vs. broad§ <i>F</i> / χ^2 (P-value)
Twelve-month persistence				
Number of 12-month attacks	12.9 (2.1)	10.8 (2.2)	10.3 (2.1)	19.1 (<0.0001)*
Number of weeks with attacks	9.1 (1.9)	7.7 (1.7)	7.3 (1.6)	14.7 (<0.0001)*
Severe role impairment (Sheehan Disability Scales)				
Home	13.4 (7.3)	11.1 (6.8)	10.7 (6.3)	563.6 (<0.0001)*
Work	15.0 (6.0)	12.4 (5.5)	11.4 (5.1)	809.1 (<0.0001)*
Interpersonal	19.4 (7.1)	16.0 (6.7)	16.2 (6.5)	995.7 (<0.0001)*
Social	17.7 (7.7)	14.6 (7.3)	15.0 (7.0)	801.7 (<0.0001)*
Summary	25.2 (7.8)	20.8 (7.3)	21.1 (7.1)	1147.9 (<0.0001)*
<i>n</i> ¶	50	55	62	4332

*Significant difference at the 0.05 level, two-sided test.

†Narrow = three or more 12-month attacks; Intermediate = three lifetime attacks in the same year and at least one attack in the past 12 months; Broad = three lifetime attacks and at least one attack in the past 12 months.

‡Assessed among 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 % and standard error are displayed.

§Bivariate linear regression model was used to assess the difference for continuous variables (the top two rows), and bivariate logistic regression was used to assess the difference for dichotomous variables (the final five rows). No controls were used in these models.

¶Number of cases in the subsample. Assessed among total Part I sample.

$\chi^2_1 = 20.6, P < 0.001$) disorders but not substance disorders (OR = 3.6; $\chi^2_1 = 3.5, P = 0.06$) after controlling for age and sex. A similar pattern of comorbidity was observed for narrow lifetime IED, which was positively related to lifetime mood (OR = 4.0; $\chi^2_1 = 11.3, P < 0.001$) and anxiety (OR = 8.8; $\chi^2_1 = 17.3, P < 0.001$) disorders but not substance disorders (OR = 3.0; $\chi^2_1 = 1.7, P = 0.19$). Models examining the association of IED with behaviour disorders produced unstable estimates due to small cell sizes.

Discussion

Study findings should be interpreted in light of the following limitations. First, IED diagnoses were not validated because IED is not assessed in the SCID. Second, estimates of disorder onset and course were based on retrospective reports. Methods shown experimentally to improve the accuracy of

such reports were utilized in the IMHS (23), but recall bias remains a concern. Third, the IED prevalence estimates are based on the operational definition of DSM-IV criteria of IED in the CIDI, which differs somewhat from other research diagnostic criteria that have been proposed (24, 25). Finally, limitations of the IMHS sample may have contributed to the low prevalence of IED reported here. The survey excluded internally displaced people, those who had already migrated out of Iraq, and residents of those areas deemed too dangerous to complete the survey (13). Because violence exposure is almost certainly higher among these groups of excluded people, it is possible that the IMHS underestimated the prevalence of IED. This may have been exacerbated by the fact that the survey was conducted during 2006–2007, while rates of violence were quite high, which likely increased non-response in the areas experiencing the highest rates of ongoing violence.

Table 5. Lifetime comorbidity of DSM-IV intermittent explosive disorder (IED) with other DSM-IV disorders

	Narrow†			Broad‡		
	% (SE)‡	OR (95% CI)§	χ^2 (P-value)	% (SE)‡	OR (95% CI)§	χ^2 (P-value)
Mood disorders¶						
Major depressive disorder (MDD)	21.3 (7.2)	4.0 (1.8–9.1)*	11.5 (0.001)*	21.9 (6.7)	4.2 (2.0–8.7)*	15.1 (0.000)*
Dysthymia	0.2 (0.2)	0.3 (0.0–2.9)	1.0 (0.310)	0.1 (0.1)	0.3 (0.0–2.7)	1.2 (0.270)
Any mood disorder	21.3 (7.2)	4.0 (1.7–9.0)*	11.3 (0.001)*	21.9 (6.7)	4.1 (2.0–8.6)*	14.8 (0.000)*
Anxiety disorders¶						
Agoraphobia	4.3 (3.3)	7.1 (1.3–39.1)*	5.2 (0.020)	3.9 (3.0)	6.1 (1.1–33.1)*	4.6 (0.030)
Generalized anxiety disorder	39.2 (13.2)	16.0 (5.5–46.4)*	27.4 (<0.0001)*	38.2 (11.7)	15.7 (6.1–40.5)*	33.6 (<0.0001)*
Panic disorder	2.6 (0.8)	2.0 (0.9–4.4)	3.2 (0.070)	2.5 (0.7)	1.9 (0.9–4.1)	2.8 (0.090)
Post-traumatic stress disorder	12.0 (4.8)	5.8 (2.3–14.5)*	14.3 (0.000)*	13.6 (5.0)	6.9 (2.9–16.1)*	20.7 (<0.0001)*
Social phobia	5.2 (3.5)	7.9 (1.5–41.1)*	6.4 (0.010)	4.6 (3.1)	7.0 (1.4–35.5)*	5.8 (0.020)
Specific phobia	1.2 (0.8)	0.3 (0.1–1.2)	3.1 (0.080)	1.1 (0.7)	0.3 (0.1–1.0)	3.7 (0.050)
Any anxiety disorder	54.6 (13.3)	8.8 (3.1–25.0)*	17.3 (<0.0001)*	54.1 (12.0)	8.6 (3.3–22.2)*	20.6 (<0.0001)*
Impulse-control disorders¶						
Oppositional defiant disorder	0.0 (0.0)	–	–	0.0 (0.0)	–	–
Attention deficit hyperactivity disorder	4.4 (3.5)	–	–	3.9 (3.1)	–	–
Any impulse-control disorder	4.4 (3.5)	–	–	3.9 (3.1)	–	–
Substance use disorders¶						
Alcohol abuse	0.0 (0.0)	–	–	0.0 (0.0)	–	–
Alcohol dependence with abuse	2.2 (2.2)	11.7 (1.1–123.6)*	4.4 (0.040)	2.8 (2.1)	16.3 (2.2–118.4)*	7.9 (0.005)*
Drug abuse	0.7 (0.7)	6.5 (0.8–55.5)	3.0 (0.080)	0.7 (0.7)	5.6 (0.6–49.6)	2.5 (0.110)
Drug dependence with abuse	0.7 (0.7)	–	–	0.7 (0.7)	–	–
Any substance disorder	3.0 (2.3)	3.0 (0.6–15.4)	1.7 (0.190)	3.5 (2.2)	3.6 (0.9–14.1)	3.5 (0.060)
Any disorder¶						
At least one disorder	61.6 (12.5)	8.7 (3.2–23.4)*	18.9 (<0.0001)*	61.2 (11.3)	8.5 (3.4–21.0)*	22.5 (<0.0001)*
Exactly one disorder	29.1 (8.1)	3.4 (1.6–7.3)*	10.8 (0.001)*	29.3 (7.1)	3.4 (1.7–6.8)*	13.3 (0.000)*
Exactly two disorders	17.0 (7.9)	6.2 (1.8–21.1)*	9.0 (0.003)*	16.0 (7.0)	5.8 (1.9–17.6)*	10.0 (0.002)*
Three or more disorders	15.5 (6.8)	8.5 (2.8–25.2)*	15.4 (<0.0001)*	15.9 (6.3)	8.9 (3.4–23.4)*	20.4 (<0.0001)*
n	4332			4332		

–, Model did not converge. Results not shown.

*Significant at the 0.05 level, two-sided test, controlling for age and sex.

†Narrow = three or more annual attacks in at least 1 year of life; Broad = three or more lifetime attacks.

‡Prevalence of the row variables among the column variables. For example, in the first row, there are 21.3% of people with lifetime narrow (first column) IED with MDD.

§Bivariate logistic regression models controlling for age and sex, to predict lifetime narrow (first column) or broad (second column) IED with other DSM-IV disorders.

¶Refer to Country Compare document at http://www.hcp.med.harvard.edu/wmh/national_sample.php for whether the disorder was assessed in the Part I sample, Part II sample, or whether it was assessed at all. For the any categories (any mood, any anxiety, etc), or the number of disorders (at least one, exactly one, exactly two, etc), the smallest weight is used. For example, any mood was assessed in the Part I sample, as all the disorders included are assessed in the Part I sample. Any anxiety was assessed in the Part II sample as some anxiety disorders were assessed in the Part II sample.

Within the context of these limitations, we provide the first national data on the prevalence and correlates of IED in Iraq. IED is relatively uncommon in Iraq, with lifetime prevalence of 1.5–1.7% and 12-month prevalence of 1.1–1.5%. These prevalence estimates are lower than the 5.5–7.4% lifetime prevalence and 2.8–4.1% 12-month prevalence found in the United States using the same diagnostic assessment (4). The low prevalence of IED in Iraq is somewhat unexpected, given the association between exposure to multiple traumatic events and risk of IED (5). Iraqis have been exposed to war, widespread violence, and terrorism during the last three decades, including a series of coups in the 1960s, the Iran–Iraq war (1980–1988), the anti-Kurdish Al-Anfal campaign within the country (1986–1989), the Iraqi invasion of Kuwait resulting in the Gulf war (1991), and the continuing conflict that began with the regime change in March 2003 (10–12). Moreover, aggressive acts occurring in response to personal provocation and engagement in retaliatory aggression have been common in Iraq since the regime change in 2003 and onset of civil war (12). Retaliatory aggression in response to interpersonal provocation is quite common among individuals with IED (15, 25), and retaliatory aggression may represent a core feature of the disorder. Compared to those without the disorder, individuals with IED are more likely to respond aggressively to provocation but are no more likely to engage in aggressive behaviour in situations not involving provocation in one prior study (26). The low prevalence of IED in Iraq despite the widespread exposure to trauma and violence is surprising and warrants further examination in future research.

In addition to the lower prevalence of IED in Iraq, another notable difference between the observed findings and prior reports from the United States is the greater persistence of IED among lifetime cases in Iraq and the lack of differentiation of narrowly and broadly defined cases (4). In Iraq, the past-year prevalence of IED is nearly identical to the lifetime prevalence, suggesting high persistence of the disorder among lifetime cases. Moreover, the prevalence of broad IED is only slightly higher than the prevalence of narrow IED, and we found little evidence for greater persistence or severity among narrow as compared to broadly defined cases. Our findings are consistent, though, with those reported in the United States in showing that IED begins early in life, has a low prevalence among older adults, exhibits a persistent course, co-occurs with a wide range of other mental disorders, and is associated with significant functional impairment (4). Greater

functional impairment among narrow as compared to broad cases in Iraq is also consistent with this prior work.

Several unresolved issues regarding the IED diagnosis are worth noting in relation to our findings. The first relates to the distinction between broad and narrow definitions of IED and the lack of a temporal clustering requirement (e.g. three attacks in 1 year) associated with the diagnosis. Although findings from the United States show that narrow cases, which are associated with greater temporal clustering, are associated with greater persistence and functional impairment than broad cases (4), the distinction between broad and narrow cases was less marked in Iraq. These findings point to the importance of considering cross-national data in determining the optimal diagnostic threshold for the frequency and clustering of anger attacks in IED. Cross-national data may also be useful in evaluating whether IED is sufficiently distinct from other mental disorders to be considered a disorder in its own right. Aggressive behaviour occurs in a numerous mental disorders other than IED (27–30) and is a core feature of oppositional defiant disorder (ODD), conduct disorder (CD), and antisocial personality disorder (31, 32). Impulsive aggression has also been observed in individuals with ADHD (33). In Iraq, comorbidity of IED with other lifetime disorders is lower than in the United States, particularly substance and behaviour disorders. An additional issue concerns the types of aggressive behaviour that should be included as part of the IED diagnosis. An alternative set of diagnostic criteria for IED has been proposed that includes recurrent outbursts of verbal aggression that are out of proportion to provocation and that do not involve threatened or actual violence or destruction of property (24, 25). Previous research has shown that individuals with this type of aggression have equivalent levels of anger, hostility, aggressive responses to provocation, and functional impairment as individuals who meet full DSM-IV criteria for IED (34). These studies estimate that the prevalence of IED would be 25% higher in the United States if these behaviours were incorporated into criterion A (2). It is unclear how the prevalence of IED would change in Iraq if a broader range of aggressive behaviours were included in the diagnosis.

The prevalence of IED is lower in Iraq than in the United States, the only other country that has examined the descriptive epidemiology of IED. Although IED is relatively less common in Iraq, the disorder has an early age of onset, is highly persistent, and is associated with a substantial

degree of comorbidity and functional impairment. Iraq currently lacks national policies or systematic programmes to reduce aggression, and rates of treatment for mental health problems are remarkably low (13). Together, these trends highlight the importance of implementing violence prevention programmes to reduce the societal burden of violence in Iraq.

Acknowledgements

Implementation of the IMHS and data entry were carried out by the staff of the Iraqi MOH and MOP with direct support from the Iraqi IMHS team with funding from both the Japanese and European Funds through United Nations Development Group Iraq Trust Fund (UNDG ITF). The IMHS was carried out in conjunction with the World Health Organization World Mental Health (WMH) Survey Initiative, which is supported by the National Institute of Mental Health (NIMH; R01 MH070884), the John D. and Catherine T. MacArthur Foundation, the Pfizer Foundation, the US Public Health Service (R13-MH066849, R01-MH069864, and R01 DA016558), the Fogarty International Center (FIRCA R03-TW006481), the Pan American Health Organization, Eli Lilly and Company, Ortho-McNeil Pharmaceutical, GlaxoSmithKline, and Bristol-Myers Squibb. We thank the staff of the WMH Data Collection and Data Analysis Coordination Centres for assistance with instrumentation, fieldwork, and consultation on data analysis. None of the funders had any role in the design, analysis, interpretation of results, or preparation of this paper. A complete list of all within-country and cross-national WMH publications can be found at <http://www.hcp.med.harvard.edu/wmh/>.

Declaration of interest

Dr. Kessler has been a consultant for AstraZeneca, Analysis Group, Bristol-Myers Squibb, Cerner-Galt Associates, Eli Lilly & Company, GlaxoSmithKline Inc., HealthCore Inc., Health Dialog, Integrated Benefits Institute, John Snow Inc., Kaiser Permanente, Matria Inc., Mensante, Merck & Co, Inc., Ortho-McNeil Janssen Scientific Affairs, Pfizer Inc., Primary Care Network, Research Triangle Institute, Sanofi-Aventis Groupe, Shire US Inc., SRA International, Inc., Takeda Global Research & Development, Transcept Pharmaceuticals Inc., and Wyeth-Ayerst; has served on advisory boards for Appliance Computing II, Eli Lilly & Company, Mindsite, Ortho-McNeil Janssen Scientific Affairs, Plus One Health Management and Wyeth-Ayerst; and has had research support for his epidemiological studies from Analysis Group Inc., Bristol-Myers Squibb, Eli Lilly & Company, EPI-Q, GlaxoSmithKline, Johnson & Johnson Pharmaceuticals, Ortho-McNeil Janssen Scientific Affairs., Pfizer Inc., Sanofi-Aventis Groupe, and Shire US, Inc. The remaining authors report nothing to disclose.

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