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Intermittent Explosive Disorder in South Africa: Prevalence, Correlates and the Role of Traumatic Exposures

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Key Words
Intermittent explosive disorder, South Africa · Composite International Diagnostic Interview · Ethnicity

Abstract
Background: The epidemiology of DSM-IV intermittent explosive disorder (IED) is not well characterized in developing country settings. In South Africa, given the high rates of violence and trauma, there is particular interest in traumatic exposures as potential risk factors for IED. ***Methods:*** We examined the prevalence and predictors of IED in a nationally representative sample of 4,351 South African adults. IED and other diagnoses based on DSM-IV criteria were assessed using the World Health Organization Composite International Diagnostic Interview (CIDI). A 28-item scale was constructed to measure exposure to traumatic events. ***Results:*** Overall, 2.0% of participants (95% CI: 0–4.9%) fulfilled criteria for the narrow definition of IED, and 9.5% (95% CI: 6.6–12.3%) fulfilled criteria for the broad definition of IED. Individuals with IED experienced high rates of comorbid anxiety, mood and substance use disorders compared to non-IED participants. In multivariate analysis, a diagnosis of IED was associated with Caucasian and mixed-race ethnicity, psychiatric comorbidity and exposure to multiple traumatic events. ***Conclusion:*** These data suggest a relatively high prevalence of IED in South Africa. By reducing violence and trauma, and by providing appropriate psychological support to trauma survivors, we may be able to reduce rates of IED.

Background

Intermittent explosive disorder (IED) is an impulse control disorder characterized by several discrete episodes of failure to resist aggressive impulses that result in serious acts of assault and/or destruction of property. The degree of aggressiveness expressed during the episode is grossly out of proportion to any precipitating psychosocial stressors, and 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 [1].

Research suggests that the lifetime prevalence of DSM-IV IED in the USA is approximately 6.6%. For example, a study employing a community sample of 253 participants from the Baltimore Epidemiologic Catchment Area found that 6.32% (SE = 1.53%) met full criteria for lifetime IED [2]. Finally, a nationally representative sample of

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9,282 Americans aged 18 years and older found that 7.3% (SE = 0.4%) met criteria for lifetime IED and 3.9% (SE = 0.3%) met criteria for IED in the previous 12 months [3]. Outside of the USA, DSM-IV IED has received little attention, and little is known of the prevalence correlates of DSM-IV IED in developing countries like South Africa.

Studies examining the psychological sequelae of trauma exposure have shown that exposure to violence and trauma may contribute to violent and aggressive behavior. For example, Song et al. [4] found that exposure to violence and symptoms of psychological trauma together explained more than half of the variance in both male and female self-reported violent behavior. In a similar vein, Singer et al. [5] found that exposure to violence was one of the most important predictors of violent behavior, accounting for 24% of the variance in violent behaviors independent of other predictors. We investigated the prevalence and correlates of DSM-IV IED in a nationally representative sample of South African adults. Given the high burden of violence and trauma in South African society [6, 7], we hypothesized that traumatic life experiences may be an important predictor of IED in this setting.

Method

This study formed part of the South African Stress and Health study, a national survey of mental health conducted between 2002 and 2004. The rationale and methods of the study have been reported elsewhere [8].

Participants

A nationally representative sample of 4,351 South African adults was selected from both households and hostel quarters. The study employed a three-stage probability sampling design. The first stage entailed stratifying enumerator areas (referring to a unit of census administration) used in the 2001 South African census according to race (Black, mixed race, Indian or Caucasian), location (rural or urban) and province. These categories are used not to rectify racial constructs, but rather to allow study of the consequences of South Africa's apartheid history. The second stage involved randomly selecting 5 households from each enumerator area. In the third stage, a single adult from each household was randomly selected to participate in the study. Fieldworkers in each province with specialized training in psychiatric interviewing conducted face-to-face interviews with participants in 1 of 6 local languages. Interviewers made 3 attempts to contact an individual that was identified for participation in the study, resulting in an overall response rate of 85.5%.

Measures

Participant demographic characteristics were assessed using standard questionnaire items. The World Mental Health pencil and paper version of the WHO Composite International Diagnostic Interview (CIDI) [9] was used to establish DSM-IV psychiatric diagnoses. The CIDI has been used in cross-cultural settings with great success [10]. IED diagnoses were categorized into broad and narrow definitions following the work of Kessler et al. [3]. The broad definition required 3 lifetime attacks and at least 1 attack in the past 12 months, while the narrow definition required 3 attacks in the past 12 months; these are referred to here as 'broad IED' and 'narrow IED', respectively. To measure trauma exposure, we used a 28-item scale which measured experiences of accidents, loss of loved ones, illness, natural disasters, crime, abuse and war. These traumatic life events were categorized into ordinal variables of none, 1, 2, 3, 4–5 and 6 or more life events. Of the 28 events, 26 represent traumatic events on the screening scale for posttraumatic stress disorder according to the CIDI. The other 2 events concern violence in intimate relationships – respondents had to indicate whether they or their current/former partner had perpetrated any of the violent acts on a list (i.e. pushed, grabbed or shoved; threw something; slapped or hit) against each other.

Data Analysis

All analyses used individual-level weights to account for the complex survey design and for differential nonresponse. Associations between demographic variables, comorbid psychiatric disorders, traumatic event exposure and IED were assessed using Pearson's χ^2 test for proportions. A series of multiple logistic regression models was computed to examine the effects of the aforementioned variables on IED and is reported here as odds ratios with respective confidence intervals (CI). All statistical tests were 2-sided at $\alpha = 0.05$.

Results

Prevalence and Sociodemographic Correlates of IED

Overall 2.0% of the sample (95% CI: 0–4.9%) fulfilled the criteria for the narrow definition of DSM-IV IED, and 9.5% (95% CI: 6.6–12.3%) fulfilled the criteria for the broad definition of DSM-IV IED. Univariate analyses demonstrated several significant sociodemographic correlates of having a diagnosis of IED (table 1), including male gender, mixed-race or Caucasian ethnicity (black ethnicity served as the reference category for ethnicity analyses), rural residence, employment and household income. Significant sociodemographic correlates of narrow IED were mixed-race or Caucasian ethnicity, and household income.

Violent Outbursts, Role Impairment and Injury

As per the definitions of broad and narrow IED, narrow IED participants reported twice as many attacks in the past 12 months (medians, 4 vs. 2, respectively) and twice as many weeks with attacks in the past year (medians, 2 vs. 1, respectively) than broad IED participants. In addition, role impairment was more common among

Table 1. Prevalence and sociodemographic correlates of DSM-IV-defined IED in a nationally representative sample of South African adults

	No IED %	Narrow IED %	Broad IED %	Narrow IED OR	Broad IED OR
Age					
18–29 years	39.2	38.7	38.7	1.0	1.0
30–39 years	22.1	21.2	22.1	0.97 (0.54–1.8)	1.01 (0.77–1.34)
40–49 years	17.8	22.9	21.6	1.3 (0.73–2.3)	1.23 (0.91–1.67)
50 or older	21.1	17.3	17.5	0.84 (0.36–1.94)	0.84 (0.58–1.21)
Sex					
Male	45.4	47.0	54.0	1.0	1.0
Female	54.6	53.0	46.0	0.97 (0.60–1.60)	0.71 (0.57–0.89)
Ethnic group					
Black	77.6	53.0	64.9	1.0	1.0
Mixed race	9.8	20.4	15.6	2.90 (1.51–5.57)	1.91 (1.31–2.77)
White	9.1	24.4	16.9	3.69 (1.53–8.91)	2.22 (1.43–3.44)
Indian/Asian	3.5	2.2	2.5	0.94 (0.52–1.71)	0.87 (0.51–1.50)
Marital status					
Single	49.8	45.4	50.2	1.0	1.0
Married	50.2	54.6	49.8	1.2 (0.82–1.76)	0.98 (0.80–1.24)
Geographic location					
Rural	60.4	77.5	71.6	1.0	1.0
Urban	39.6	22.5	28.4	0.46 (0.21–1.00)	0.61 (0.42–0.88)
Educational level[1]					
None	6.9	11.5	6.0	1.0	1.0
Grade 1–7	19.7	13.6	14.3	0.41 (0.14–1.16)	0.84 (0.44–1.61)
Grade 8–11	35.2	41.5	37.1	0.68 (0.24–1.91)	1.22 (0.64–2.32)
Grade 12	23.3	20.1	24.6	0.49 (0.18–1.32)	1.21 (0.65–2.26)
Tertiary education	15.0	13.3	18.1	0.50 (0.14–1.79)	1.49 (0.71–2.75)
Employment status					
Unemployed	69.9	62.1	61.2	1.0	1.0
Employed	30.1	37.9	38.8	1.37 (0.76–2.46)	1.47 (1.05–2.05)
Annual household income					
None	14.2	8.0	8.9	1.0	1.0
ZAR 1–5,000	30.1	25.4	25.1	1.48 (0.62–3.50)	1.33 (0.91–1.94)
ZAR 5,001–25,000	15.3	15.0	15.5	1.69 (0.64–4.47)	1.61 (1.00–2.59)
ZAR 25,001–100,000	18.9	33.4	26.0	2.99 (1.22–7.33)	2.21 (1.39–3.50)
ZAR 100,001 or more	21.5	18.2	24.6	1.43 (0.52–3.98)	1.83 (1.27–2.63)

OR = Odds ratio. Figures in parentheses are 95% CI.
[1] Highest level of education achieved.

narrow IED participants than broad IED participants across home (13 vs. 5.9%), work (14.6 vs. 7.4%), interpersonal (17.1 vs. 8.5%) and social (43 vs. 20.8%) domains. Finally, 0.6% of victims of narrow IED attacks and 3.3% of victims of broad IED attacks were injured to the extent that medical attention was required.

Comorbidity of IED with Other DSM-IV Disorders

The majority of individuals with IED (67.5% of individuals with narrow IED and 60.5% of individuals with broad IED) fulfilled criteria for at least one other DSM-IV disorder. Among narrow IED participants, 35.6% reported comorbid anxiety disorders, 27.2% reported comorbid mood disorders, and 40.6% reported comorbid substance use disorders. Regarding broad IED participants, 31% (95% CI: 26.5–35.4%) reported comorbid anxiety disorders, 22.4% reported comorbid mood disorders, and 60.5% reported comorbid substance use disorders. This was high when compared to the rates of comorbidity among non-IED participants. Of the non-IED partici-

pants, only 12.3% reported anxiety disorders, 10.6% reported mood disorders, and 27.8% reported substance use disorders.

Lifetime and 12-Month Treatment of IED

Of the narrow IED participants, 45.6% reported having received psychological and/or psychiatric treatment at some time in their lives, and 25.4% reported having received treatment in the past year. Similar results were found for broad IED participants as 40.3% reported having received treatment at some time in their lives and 18.6% reported having received treatment in the past year (table 2).

When the effect of co-morbidity was controlled however, the difference between rates of lifetime treatment of narrow IED participants (27.9%) and non-IED participants (22.4%) became smaller, as did the difference between the rates of lifetime treatment of broad IED participants (28.1%) and lifetime treatment of non-IED par-

Table 2. Lifetime and 12-month treatment of DSM-IV-defined IED

	No IED %	Narrow IED %	Broad IED %
Lifetime			
Psychiatrist	3.7	11.4	9.1
Other mental health specialist	3.0	14.4	7.7
General medical practitioner	12.7	14.3	17.6
Any treatment	26.3	45.6	40.3
Twelve months			
Psychiatrist	0	0	0
Other mental health specialist	1.1	4.6	1.9
General medical practitioner	6.8	7.6	7.9
Any treatment	13.8	25.4	18.6

'Other mental health specialist' refers to traditional healers and religious or spiritual advisors.

'Any treatment' includes psychiatrist, other mental health specialist and general medical practitioner.

Table 3. Association between traumatic exposures and DSM-IV-defined IED

	Narrow IED %	OR	Broad IED %	OR
Crime victim	17.3	1.96 (1.03–3.75)	12.8	1.40 (0.98–1.99)
Partner violence	6.3	1.42 (0.68–2.98)	4.8	1.06 (0.64–1.77)
Sexual assault	0.57	0.84 (0.09–7.73)	1.62	2.92 (0.97–8.74)
Child abuse	2.9	0.50 (0.14–1.77)	4.8	0.86 (0.56–1.31)
Political trauma	17.9	1.71 (0.83–3.55)	16.2	1.59 (1.08–2.34)
Disaster	7.1	1.38 (0.59–3.23)	8.4	1.79 (1.16–2.75)
Threat to life	28.7	1.61 (0.88–2.94)	28.9	1.71 (1.30–2.24)
Trauma of close other(s)	3.6	0.25 (0.08–0.84)	6.3	0.44 (0.27–0.71)
Witness	3.4	0.96 (0.31–2.96)	4.1	1.20 (0.65–2.22)
Perpetrate	0	0	0	0
Other	0	0	0.16	0.18 (0.02–1.37)
Number of traumatic life events				
No trauma	12.8	1.0	12.4	1.0
1	45.2	2.45 (1.05–5.76)	41.2	2.43 (1.66–3.56)
2	9.1	1.77 (0.55–5.64)	11.2	2.37 (1.39–4.04)
3	5.4	1.79 (0.41–7.81)	7.6	2.77 (1.65–4.66)
4–5	4.5	1.17 (0.31–4.45)	9.7	2.84 (1.58–5.10)
6 or more	23.0	5.62 (2.36–13.40)	18.0	5.21 (3.39–8.02)
Number of trauma types				
0	12.8	1.0	12.4	1.0
1	86.9	2.61 (1.21–5.64)	87.2	2.90 (2.03–4.16)
2	0.4	2.86 (0.34–24.29)	0.4	3.36 (0.51–22.25)
3 or more	0.0	0	0.0	0

Figures in parentheses are 95% CI.

Table 4. Multiple logistic regression analyses predicting the odds ratio for IED

	Narrow IED OR	Broad IED OR
Age[1]	0.98 (0.96–1.00)	0.99 (0.98–1.00)
Sex		
Female	1.03 (0.64–1.64)	0.75 (0.59–0.96)
Male	1.0	1.0
Ethnic group		
Black	1.0	1.0
Mixed race	2.36 (1.21–4.59)	1.71 (1.15–2.56)
White	3.80 (1.81–7.95)	2.09 (1.24–3.52)
Asian/Indian	0.92 (0.44–1.89)	0.81 (0.45–1.44)
Geographic location		
Urban	0.70 (0.34–1.46)	0.79 (0.53–1.18)
Rural	1.0	1.0
Employment status		
Employed	0.96 (0.56–1.65)	1.10 (0.77–1.56)
Unemployed	1.0	1.0
Annual household income		
None	1.0	1.0
ZAR 1–5,000	1.28 (0.54–3.04)	1.14 (0.74–1.76)
ZAR 5,001–25,000	1.31 (0.55–3.11)	1.28 (0.77–2.12)
ZAR 25,001–100,000	1.95 (0.85–4.45)	1.64 (1.02–2.64)
ZAR 100,001 or more	0.97 (0.424–2.24)	1.44 (0.93–2.23)
Comorbidity		
Any disorder	4.11 (2.32–7.30)	3.46 (2.67–4.51)
None	1.0	1.0
Number of traumatic life events		
No trauma	1.0	1.0
1	1.83 (0.77–4.37)	1.96 (1.31–2.92)
2	1.59 (0.47–5.40)	2.12 (0.25–3.62)
3	1.47 (0.36–6.15)	2.15 (1.27–3.64)
4–5	0.89 (0.23–3.41)	2.25 (1.17–4.33)
6 or more	3.53 (1.35–9.27)	3.56 (2.20–5.75)

Figures in parentheses are 95% CI.
[1] Continuous variable.

ticipants. In addition, the difference in 12-month treatment between broad IED participants (11.8%) and non-IED participants (11.3%) became negligible. The only exception was 12-month narrow IED participants, who received almost twice as much treatment (20.9%) as 12-month non-IED participants.

IED and Trauma Exposure

We found significant trauma correlates for both narrow and broad IED (table 3). Significant trauma correlates of narrow IED were being a crime victim, trauma to close others and experiencing multiple traumas. Significant trauma correlates of broad IED were political trauma, disasters, receiving a life threat, trauma of close others and experiencing multiple traumas.

Multiple Logistic Regression Analyses Predicting IED

In the multivariate model for narrow IED (table 4), mixed-race ethnicity, Caucasian ethnicity, psychiatric comorbidity and multiple traumatic life events predicted a diagnosis of IED. For broad IED, the correlates were male gender, mixed-race ethnicity, Caucasian ethnicity, increased household income, psychiatric comorbidity and multiple traumatic life events.

Discussion

The results of this study suggest that DSM-IV-defined IED is relatively common in South Africa, as 2.0% of the study population fulfilled the criteria for the narrow definition of DSM-IV IED and almost 10% fulfilled the criteria for the broad definition of DSM-IV IED. These prevalence estimates are comparable with estimates by previous studies in the USA [2, 3, 11] and suggest that IED is more prevalent than previously thought.

Although most sociodemographic correlates of IED were only modestly associated with IED, Caucasian ethnicity, mixed-race ethnicity (in the case of narrow IED) and an increased household income demonstrated fairly robust associations with IED. These findings suggest that IED may be concentrated in subdivisions of South African society, a finding that differs from those in the USA [3].

Regarding psychiatric comorbidity, IED participants experienced high levels of anxiety, mood and substance use disorders compared to non-IED participants. While Coccaro et al. [11] and Kessler et al. [3] also found that the IED participants in their samples displayed comorbid mood, anxiety and substance use disorders, the frequency of comorbid disorders was notably lower in our sample.

With regard to the frequency of violent outbursts and role impairment in IED, narrow IED participants expectedly reported twice as many attacks in the past 12 months and twice as many weeks with attacks in the past year than broad IED participants. Narrow IED participants also reported higher levels of role impairment across all domains of interpersonal interaction. Even so, only half of participants meeting the narrow definition of IED reported having received psychological and/or psychiatric treatment sometime in their lifetime, and just a quarter reported having received treatment in the past year. Broad IED participants, on the other hand, reported even lower levels of treatment and less than half reported having received psychological and/or psychiatric treatment at

some time in their lives and only a fifth reported having received treatment in the past year.

It is important to note that while participants with IED did engage in treatment-seeking behavior more frequently than those without IED, differences in rates diminished when covariation in psychiatric comorbidity was controlled for. This finding suggests that IED participants may have sought treatment for comorbid anxiety, mood and substance use disorders, rather than for IED symptoms specifically. An exception was narrow IED participants who received almost twice as much treatment in the past 12 months as 12-month non-IED participants. This may be accounted for by the high frequency of violent outbursts and significant role impairment characteristic of narrow IED.

We found that most trauma variables were only modestly associated with IED. Nonetheless, experiencing multiple traumas was a relatively robust correlate of narrow IED, and experiencing one trauma type was a relatively robust correlate of broad IED. These findings are congruent with studies that have examined the psychological sequelae of trauma exposure. For example, Song et al. [4] found that exposure to violence and symptoms of psychological trauma together explained more than half of the variance in both male and female self-reported violent behavior. In addition, Singer et al. [5] found that exposure to violence (independently of other predictors) accounted for 24% of the variance in violent behaviors. Taken together, these data provide tentative evidence for the role of traumatic exposures in IED. Further research is required to substantiate our findings.

In the multivariate models, the strongest independent predictors of narrow IED were Caucasian and mixed-race ethnicity, psychiatric comorbidity and 6 or more traumatic life events. Caucasian ethnicity and psychiatric comorbidity were also the most robust predictors of broad IED participants behaving violently, while male gender, mixed-race ethnicity, increased household income and exposure to multiple traumatic life events were lesser risk factors. Taken together, it seems that middle-class Caucasian and mixed-race males who experience high levels of psychiatric comorbidity and who have been exposed to multiple traumatic life events are at the highest risk of developing DSM-IV-defined IED.

There are several important limitations of this study that need to be acknowledged. First, the cross-sectional design employed does not permit estimations of the temporality of associations between IED and other variables. Secondly, estimates of treatment-seeking behavior and traumatic exposures were based on retrospective self-reports by participants. As such, recall bias and social desirability may have introduced systematic error, possibly leading to measured values being systematically too high or too low. Thirdly, the cross-cultural validity of the CIDI [9] in the South African context has not yet been established. As such, certain ethnic groups (especially Black South Africans) may have been underrepresented, accounting for the lower levels of IED among Black South Africans.

Notwithstanding these concerns, a strength of this study was the generalizability of these results to the South African population given the nationally representative sampling. In addition, this study presents the first data on DSM-IV IED in sub-Saharan Africa and therefore makes a significant contribution to the limited literature on DSM-IV IED. These data also provide baseline data for clinical practice and public health.

In summary, this study presents new insights into the epidemiology of IED in South Africa. The substantial burden of IED, and strong associations with psychiatric comorbidity and traumatic life events, highlights the important role which this condition may play in public mental health. Regarding IED prevention and treatment, these data suggest that by reducing violence and trauma, and by providing appropriate psychological support to trauma survivors, we may be able to prevent the onset of IED symptomatology. Moreover, the finding that people with IED were less likely to behave violently if a close other had been exposed to trauma suggests that exposing the general public to the stories and experiences of survivors of violence and trauma may be helpful in reducing violent behavior by those meeting diagnostic criteria for IED. Research evaluating the relationship between empathy and aggression provides credence for such a conclusion [12, 13].

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Erratum

In the paper by Fincham D, Grimsrud A, Corrigall J, Williams DR, Seedat S, Stein DJ, Myer L, entitled 'Intermittent explosive disorder in South Africa: prevalence, correlates and the role of traumatic exposures [Psychopathology 2009;42:92–98, DOI: 10.1159/000203341], from South Africa's Stress and Health Study, we estimated that in a nationally representative community survey in South Africa, 2% of participants fulfilled criteria for a narrow definition of intermittent explosive disorder (IED), and 9.5% of participants fulfilled criteria for a broad definition of IED.

A review of these results, undertaken as part of the World Mental Health Survey Initiative's ongoing efforts on IED, has indicated that these calculations were incorrect (http://www.hcp.med.harvard.edu/wmh/ftpdir/Fincher_et_al_2009_erratum.pdf): instead, 1.2% of participants fulfilled criteria for a narrow definition of 12-month IED, and 1.8% of participants fulfilled criteria for a broad definition of 12-month IED. Other analyses undertaken in the paper are consequently also incorrect.

Analyses in other papers from South Africa's Stress and Health Study are not affected.