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# Prevalence and clinical correlates of intermittent explosive disorder in Turkish psychiatric outpatients

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ABSTRACT

*Objective:* Intermittent explosive disorder (IED) is defined as the failure to resist aggressive impulses resulting in repeated acts of verbal and/or physical aggression. Although it is frequently encountered in clinical psychiatric practice, there is a paucity of data concerning IED in the scientific literature both internationally and in Turkey. The aim of this study was to evaluate the prevalence of IED and associated sociodemographic and clinical features in a clinical setting.

*Methods:* A total of 406 patients who were referred to our psychiatry outpatient clinic for the first time in a six-month period were included in the study. The diagnosis of IED was made using both Diagnostic and Statistical Manual of Mental Disorders 4th edition (DSM-IV) and DSM-5 criteria. Axis I disorder and personality disorder diagnoses were made according to DSM-5 criteria. Diagnoses were based on information from the Structured Clinical Interview for DSM-IV (SCID I) and the Structured Clinical Interview for DSM-IV personality disorders (SCID II), Symptom Checklist-90 (SCL-90), Wender Utah Rating Scale, Adult Attention Deficit Hyperactivity Disorder (ADHD) DSM-IV Based Diagnostic Screening and Rating Scale, a clinical interview conducted by the researcher, and a sociodemographic data form. In addition, participants were administered the Buss-Perry Aggression Scale and Barratt Impulsiveness Scale Version 11 (BIS-11) to assess aggression and impulsivity.

*Results:* Lifetime and 12-month prevalence of IED according to DSM-5 were 16.7% and 11.3%, respectively. Mean age at onset was 16.4 years. The prevalence of lifetime IED was 3.8 times higher in males than females (95% CI = 1.9–7.5); twice as high in individuals living in rural areas compared to those living in urban centers (95% CI = 1.1–3.7); 2.7 times higher among those with lifetime suicide attempt versus those without (95% CI = 1.3–5.6); 4.5 times higher in those with lifetime self-injurious behavior compared to those without (95% CI = 2.3–8.7); and 3 times higher in individuals reporting aggression/anger problems in the family compared to those without (95% CI = 1.5–5.9). The prevalences of childhood ADHD, conduct disorder, and oppositional defiant disorder were significantly higher in the IED group.

*Conclusion:* The result of the current study has revealed that approximately one-sixth of respondents experienced lifetime IED according to DSM-5 diagnostic criteria. Statistically significant sociodemographic correlates of IED include gender, urbanicity, history of suicide attempt, history of self-injurious behavior, and family history of aggression/anger problems.



## 1. Introduction

Intermittent explosive disorder (IED) is defined as a failure to resist aggressive impulses, resulting in recurrent acts of impulsive aggression [1]. Although the Diagnostic and Statistical Manual of Mental Disorders fourth edition (DSM-IV) criteria focused on physical aggression, DSM-5 allows IED diagnosis in the presence of frequent verbal aggression with or without concurrent physical aggression. Individuals who meet the criteria for IED experience recurrent episodes of verbal and/or physical aggression that are disproportionate to any psychosocial stressor or provocation and not better accounted for by the presence of other mental disorders or the effects of a substance-related or medical condition. According to the diagnostic criteria, the aggressive behavior is related to anger or impulse, as opposed to aggression in the pursuit of secondary gain such as money or power, and is associated with substantial distress, troubled relationships, occupational and social impairment, and legal or financial problems.

Some epidemiological and clinical studies showed that the disorder occurs significantly more often in males and younger individuals, with a mean age at onset of 14–18 years [2–7]. In contrast, there are some community and clinical studies in the literature reporting that IED

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affects males and females approximately equally [8–10]. However, it has not been clearly established whether IED is associated with other sociodemographic correlates such as ethnicity, marital or occupational status, level of education, or family income [3,4,9,11,12]. In addition, high comorbidity rates have been documented, along with mood, anxiety and substance-related disorders [3,11,13].

As for the prevalence of IED, there are a limited number of epidemiological studies examining the prevalence and correlates of IED, most conducted in the U.S. The lifetime prevalence of IED was reported to be 5–7% in the U.S., 2% in Japan, 1.7% in Iraq, and 9% in South Africa [3–5,8,9,11]. Some studies assessing the prevalence of IED among psychiatric clinical samples reported rates of 3–7% [10,14–16]. Although findings of IED prevalence have varied due to variably in the definition of IED used, data collection methodology, and cultural context, the evidence suggests that IED is common in clinical settings [8,10,17].

During the DSM-III/III-R/IV revision process, studies conducted on the biology and treatment of aggression demonstrated that some individuals with IED exhibit only 'high-frequency/low-intensity' aggressive outbursts, in addition to the 'low-frequency/high-intensity' aggressive outbursts characterized as the 'A criterion' in DSM-IV [18,19]. This finding led to the development of research criteria aimed to clarify the nature of IED and describe and categorize individuals with recurrent, impulsive aggression [6,18]. Furthermore, the concept of aggressive behavior was expanded include all forms of aggression ranging from verbal assault and non-damaging/non-destructive physical aggression toward objects, animals or individuals to damaging/destructive aggression toward objects, animals or individuals [20]. The most recent version of research criteria for IED divided the A criterion into $A_1$ (high-frequency/low-intensity) and $A_2$ (low-frequency/high-intensity) to identify the nature and time frame of aggression [18]. While the $A_1$ criterion was not part of the formal diagnostic criteria in DSM-IV, it was acknowledged as an associated feature in DSM-IV-Text Revision (TR) [19]. The $A_1$ and $A_2$ criteria were brought from 'associated feature' in the DSM-IV-TR into the formal diagnostic criteria in DSM-5, which was estimated to increase the rate of IED diagnosis among individuals with recurrent, impulsive aggression by 20% [19]. Moreover, the diagnostic criteria for IED were expanded to include verbal aggression in the DSM-5. Accordingly, the prevalence of IED is expected to be higher according to the DSM-5 compared to previous diagnostic criteria [21].

IED is associated with higher scores on a variety of psychometric assessments beyond the typical measures of physical or verbal aggression and impulsivity [13]. Although no self-report instrument is available for the screening or assessment of IED, there are several instruments typically used in research settings, including the Barratt Impulsiveness Scale (BIS-11), Buss-Perry Aggression Questionnaire (BPAQ), Affect Lability Scale, Life History of Aggression Questionnaire (LHA), Life History of Impulsive Behavior (LHIB), and State-Trait Anger and Expression of Anger (STAXI) scales [2,19,22,23]. With regard to impulsivity, a recent study compared individuals diagnosed with IED with psychiatric controls and healty volunteers on the varied facets of impulsivity such as negative and positive urgency, sensation seeking, lack of perseverance and premeditation, using the UPPS-P impulsive behavior scale [24]. This study found that positive/negative urgency was greater among those with IED compared to healty controls, and that heightened negative urgency specifically discriminated IED from other psychopathology. The study further found that negative urgency was associated with poorer anger control and increased trait of anger within the IED group [24]. Self-report studies also show that IED is associated with suicide attempts and non-suicidal self-injurious behaviors [6,22,25] as well as trauma [5,11,26]. In fact, exposure to trauma in childhood may be one of the factors thought to contribute the development of IED. In addition, DSM-5, by including verbal aggression as a new criterion, has brought a new dimension to the types of aggressive episodes reported. A recent study on IED focused on how individuals with verbal aggression differ from those with physical aggression. Individuals with both frequent verbal arguments and repeated physical aggression were shown to exhibit a more severe profile, with greater trait anger, anger dyscontrol, higher number of aggressive acts, and greater motor impulsivity and aggression [23]. It was also determined in the same study that individuals with only verbal aggression and those with only physical aggression showed comparable deficits and impairment [23].

These facts highlight the necessity to replicate the findings described for IED in different populations, regions, and cultures to facilitate adequate recognition of IED and its clinical appearance and demonstrate the availability of the signs and the established diagnostic criteria. The purpose of the current study was to examine the prevalence of IED according to both DSM-5 and DSM-IV diagnostic criteria and to evaluate associated sociodemographic and clinical features in a clinical setting.

## 2. Materials and methods

### 2.1. Study setting and subjects

This standalone study was conducted as a specialization thesis for psychiatry between January 2015 and June 2015 at the outpatient clinic of the Department of Psychiatry, Cukurova University Faculty of Medicine. The hospital of Cukurova University Medical School is a tertiary level hospital located in Adana, in the southern part of Turkey, and serves a population of 3 million including the surrounding provinces. The study sample was comprised patients that were referred to the psychiatry outpatient clinic for the first time. The average number of first-time referrals to our psychiatric outpatient clinic was 20 patients per day, and it was predicted that an average of 2400 patients would be referred to our clinic for the first time during the 6-month study period.

Prior to the current study, there were no studies conducted in Turkey on IED except for studies investigating impulse control disorders [27–29]. Therefore, the smallest sample size needed was calculated using the OpenEpi program [30] based on the prevalence values in a systematic review published in 2014 [2]. When the lifetime prevalence of IED was accepted as 5% with 2% deviation according to this systematic review, the smallest sample size required for 80% power and 95% confidence was calculated as 384.

At the beginning of the study before the recruitment of participants, we have carried out a pre-operational study and found out that an average of 20 patients applied to our outpatient clinics for the first time each day. As the study was a specialization study conducted by one person (the first author), it would have been very lengthy and not possible to include all of these cases. So to reach the number of cases calculated by power analysis and time period we needed to complete study, we estimated that 4 cases per day will be sufficient to complete the study in estimated time period. To avoid any bias, we included first 4 cases which is still a randomized procedure and we believe it does not interfere the generalizability of our results. If a patient did not agree to participate in the study or did not meet the criteria for inclusion, the next patient who met the inclusion criteria was included in the study.

The inclusion criteria were being 18 years of age or over, literate, and referred to the outpatient clinic for the first time. A total of 456 participants were interviewed during the study period. Of these, 50 were excluded. Nine patients had psychotic episode, 1 had manic episode, 1 had a diagnosis of mental retardation, and 1 had a diagnosis of dementia at the time of interview. The remaining 38 participants were excluded from the analyses due to missing data on the scales. Consequently, 406 participants were included in the data analysis. The study protocol was approved by the institutional review board and written informed consent was obtained from all participants before the study.

### 2.2. Measures and procedure

Data were collected by two different methods. First, the participants completed a demographic data form and self-report scales. Other data were gathered via the diagnostic and clinical interviews conducted by the researcher.

Sociodemographic variables (age, gender, education, marital status, socioeconomic and employment status, and urbanicity) were obtained from a demographic data form completed by participants. In addition, another demographic data form was designed by the researcher for use in the research. This secondary data form included clinical features such as history of childhood trauma; psychiatric treatment; past aggression/anger episodes with loss of control marked by physically or verbally assaulting others or destroying property; complaints of aggression/anger and previous reference for treatment; lifetime suicide attempt or self-injurious behavior; medical history; and family history of characteristics such as psychiatric illness, aggression/anger, lifetime suicide attempt, and self-injurious behavior. This form was completed by the researcher based on data collected during interviews with participants and their relatives.

Both DSM-5 and DSM-IV diagnostic criteria were used to assess IED. The modified version of the Minnesota Impulse Disorders Interview (MIDI) has been used previously as a 'querying instrument' in order to investigate the presence of lifetime impulse control disorders (ICDs) [31]. MIDI is a 36-item semi-structured interview that includes separate screening modules for exploring the DSM-IV criteria for ICDs (pathological gambling, IED, trichotillomania, kleptomania, pyromania, compulsive buying, compulsive sexual behavior, and compulsive exercise). The inquiries about compulsive exercise were not used in our study, thus we refer to using a 'modified version the MIDI'.

Firstly, the demographic data form was used to evaluate whether patients had complaints of aggression/anger as a primary concern or had experienced any episodes of aggression/anger with loss of control resulting in physical or verbal assault of others or destruction of property. After the patients had answered the general screening questions affirmatively in the MIDI, they were questioned mirroring the DSM-5 criteria. Diagnosis was made after a succinct psychiatric interview including evaluation of psychiatric history with emphasis on aggressive impulsive episodes and behavior. Patients with history of aggression were questioned about the nature of their aggression (i.e. whether aggression was unplanned and grossly out of proportion to the provocation; consequences of aggressive behavior; signs of generalized aggressiveness between these episodes; related psychosocial distress; and functioning). Family members and significant others were also interviewed whenever possible for corroboration of family and previous psychiatric history. In summary, MIDI, a semi-structured interview, was used as a prediagnostic instrument in the diagnostic process of IED.

The current study also examined the differences between patients diagnosed with IED based on only verbal aggression criteria (verbal outbursts occurring on average at least twice a week for 3 months or more) (IED-V), only physical aggression criteria (three assaults on people, animals or property with damage/injury over a 12-month period or an average of two assaults on people, animals or property without damage/injury per week for 3 months) (IED-P), and both physical and verbal aggression criteria (IED-B).

Non-IED Axis I diagnoses were assigned using the Turkish version of the Structured Clinical Interview for DSM-IV (SCID-I) [32]. Considering the changes in diagnostic criteria in the DSM-5, an assessment was also made via DSM-5 by questioning the diagnostic criteria of the disorders, respectively. In addition, all participants completed the Turkish version of the Symptom Checklist-90 (SCL-90), which has adequate interrater reliability of 0.65–0.87 [33]. The SCL-90 is used to assess psychological symptoms. The symptom dimensions are somatization, anxiety, obsessive-compulsive, depression, interpersonal sensitivity, hostility, phobic anxiety, paranoid ideation, psychoticism, and additional items. Personality disorder diagnoses were made using information from the semi-structured Interview for DSM-IV (SCID-II) and the clinical interview conducted by the researcher. The SCID-II has good reliability, with a kappa value of 0.798 [34].

Several measures were used to assess self-ratings of aggression and impulsivity. All participants completed the Turkish version of the Barratt Impulsivity Scale Version 11 (BIS-11) and Turkish version of the Buss-Perry Aggression Questionnaire (BPAQ) to assess different aspects of impulsivity and aggression. The BIS-11 is a 30-item self-report questionnaire of impulsive personality traits grouped into three subscales: attentional (inattention and cognitive instability), motor (motor impulsiveness and lack of perseverance), and non-planning (lack of self-control and intolerance of cognitive complexity) [35]. BIS-11 yields a total score and 3 different subscores for non-planning activity, attentional (cognitive) impulsivity, and motor impulsivity. The BPAQ is a 28-item self-report measure assessing tendency to act aggressively as a personality trait [36]. The evaluation of BPAQ also gives 4 different subscores for physical aggression, verbal aggression, anger, and hostility. Both have been found to be valid and reliable, presenting psychometric properties similar to the original versions.

Childhood and adult attention-deficit hyperactivity disorder (ADHD) were diagnosed using the Wender Utah Rating Scale (WURS) and Adult ADD/ADHD DSM-IV Based Diagnostic Screening and Rating Scale. The WURS is a self-report scale consisting of 25 items with a cut-off score of 36. It is used to retrospectively diagnose childhood ADHD in adults, with the aim of achieving a sensitivity of 82.5% and a specificity of 90.8% [37]. Additionally, the Turkish version of Adult ADD/ADHD DSM-IV Based Diagnostic Screening and Rating Scale was administered to all participants to diagnose ADHD during adulthood. The ADHD scale is a five-point Likert scale with three subscales: attention deficit (9 items based on DSM-IV inattention symptoms); hyperactivity/impulsivity (9 items based on DSM-IV hyperactivity symptoms); and ADHD characteristics and problems (30 items based on clinical experience and observations) [38]. Participants who gave an answer worth 2 or 3 points for at least 6 of the 9 items in the first and/or second parts of the scale were diagnosed with ADHD.

### 2.3. Statistical analysis

Descriptive statistical analyses were applied for the assessment of demographic and clinical characteristics of the entire group. Chi-square test and Fisher's exact test were used to analyze categorical variables and *t*-test was used for the comparison of parametric continuous variables. ANOVA was performed with Tukey HSD for comparisons of measurement data between the IED-V, IED-P, and IED-B groups. A two-tailed alpha value of 0.05 was used to denote statistical significance for all analyses. In addition, logistic regression analysis was performed by creating a model with variables found significant in univariate analyses.

## 3. Results

The study group comprised 143 men and 263 women between the ages of 18 and 75 years (mean 33.7 $\pm$ 12.9 years) who were referred to our outpatient clinic during the study period. The majority of the sample was married (53%), had low socioeconomic status (56%), was unemployed (70%), lived in urban centers (67%), and was relatively well-educated (67% were at least high school graduate).

Two-thirds of the sample reported experiencing at least one aggression/anger episode with loss of control, and 40% of the group reported having an aggression/anger problem if questioned during the clinical interview. Aggression/anger was the main complaint for 14.5% of the participants and 16% had previously sought treatment for this complaint.

The lifetime and 12-month prevalence rates for IED according to the DSM-5 criteria were 16.7% and 11.3%, respectively. Using the DSM-IV criteria, these rates decreased to 16.3% and 10.8%, respectively.

The sociodemographic characteristics of the participants with and without lifetime IED are shown in Table 1. Statistically significant sociodemographic correlates of lifetime DSM-5 IED were gender, employment status, and urbanicity. The lifetime prevalence of IED was higher among males than females (29.4% vs 9.9%, $p < 0.001$). Living in rural areas was associated with higher IED prevalence. The groups did

**Table 1**
Sociodemographic variables as a function of lifetime DSM-5 IED and non-IED groups.

| | IED (+) (n = 68) | IED (−) (n = 338) | p |
|---|---|---|---|
| Age (years) (mean ± SD) | 31.5 ± 12.1 | 34.2 ± 13.1 | p = 0.111 |
| Gender | | | |
| Female | 26 (9.9) | 237 (90.1) | **p < 0.001** |
| Male | 42 (29.4) | 101 (70.6) | |
| Marital status | | | |
| Married | 38 (17.7) | 177 (82.3) | p = 0.417 |
| Single | 29 (16.3) | 144 (83.7) | |
| Divorced/widow | 1 (5.6) | 17 (94.4) | |
| Education level | | | |
| Elementary school | 18 (13.4) | 116 (86.6) | p = 0.430 |
| High school | 26 (17.7) | 121 (82.3) | |
| College | 24 (19.2) | 101 (80.8) | |
| Economic status | | | |
| Low | 36 (15.9) | 190 (84.1) | p = 0.620 |
| Middle/high | 32 (17.8) | 148 (82.2) | |
| Employment status | | | |
| Employed | 31 (25.2) | 92 (74.8) | **p = 0.003** |
| Unemployed | 37 (13.1) | 246 (86.9) | |
| Urbanicity | | | |
| Rural areas | 31 (23.3) | 102 (76.7) | **p = 0.013** |
| Urban centers | 37 (13.6) | 236 (86.4) | |

The numbers in parentheses represent row percentages.

**Table 3**
Comorbidity of DSM-5 IED with other DSM-5 disorders.

| | IED(+) (n = 68), n (%) | IED(−) (n = 338), n (%) | p |
|---|---|---|---|
| ADHD, childhood | 34 (50.0) | 62 (18.0) | <**0.001** |
| ADHD, 12-month | 21 (30.9) | 48 (14.2) | **0.01** |
| Oppositional defiant disorder, childhood | 33 (48.5) | 44 (13.0) | <**0.001** |
| Oppositional defiant disorder, 12-month | 25 (36.8) | 34 (10.1) | <**0.001** |
| Conduct disorder, childhood | 23 (33.8) | 33 (9.8) | <**0.001** |
| Conduct disorder, 12-month | 4 (5.9) | 4 (1.2) | **0.030** |
| Compulsive buying | 23 (33.8) | 32 (9.5) | <**0.001** |
| Kleptomania | 2 (2.9) | 2 (0.6) | 0.132 |
| Trichotillomania | 12 (17.6) | 24 (7.1) | **0.005** |
| Pyromania | 4 (5.9) | 0 (0) | **0.001** |
| Gambling disorder | 5 (7.4) | 7 (2.1) | **0.035** |
| Compulsive sexual behavior | 6 (8.8) | 1 (0.3) | <**0.001** |
| Anxiety disorders | 15 (22.1) | 75 (22.2) | 0.981 |
| Depression | 22 (32.4) | 116 (34.3) | 0.755 |
| Bipolar disorder | 0 (0) | 6 (1.8) | 0.595 |
| Obsessive compulsive disorder | 21 (30.9) | 70 (20.7) | 0.066 |
| Alcohol/substance-related disorders | 6 (8.8) | 12(3.6) | 0.096 |
| Personality disorders | 12 (17.6) | 28 (8.3) | **0.018** |

Kleptomania, trichotillomania, pyromania, and gambling disorder are also required to be specified separately from the categories in which they are included in DSM-5.

not differ in terms of age, marital status, economic status, or education level ($p > 0.05$). Mean age at onset of IED was 16.4 ± 3.5 years.

The prevalence rates of childhood trauma, lifetime suicide attempt, and lifetime self-injurious behavior among the total sample were 31.8%, 17.5%, and 36.5%, respectively. Participants in the IED group had significantly higher rates of childhood trauma, lifetime suicide attempt, and lifetime self-injurious behavior. Furthermore, the prevalence of family history of aggression/anger problem, psychiatric disorder, and lifetime suicide attempt were significantly higher in the IED group. Table 2 presents the clinical and familial features of the IED and non-IED groups.

Table 3 presents the differences in psychopathology between the IED and non-IED groups. Participants in the IED group had significantly higher rates of childhood disorders ($p < 0.001$) and personality disorders ($p = 0.018$) than individuals in the non-IED group. The IED group also had higher rates of 'impulse control disorders not elsewhere classified' as stated in DSM-IV such as trichotillomania ($p = 0.005$), pyromania ($p = 0.001$), and gambling disorder ($p = 0.035$).

There were statistically significant differences between the IED and non-IED groups in terms of all general factors and subscale scores of the SCL-90. In addition, aggression, anger, hostility, and impulsivity scores were significantly higher in the IED group ($p < 0.05$). Table 4 shows self-reported aggression, anger, and impulsivity scores of IED and non-IED groups.

Table 5 shows the gender-based comparison of DSM-5 diagnostic criteria including aggression, related constructs, and associated impairments in participants with lifetime DSM-5 IED. Presence of A2 criterion marked by physical aggression resulting in physical injury ($p = 0.007$) and occupational impairment ($p = 0.01$) were significantly more common among males.

The current study compared participants with lifetime and 12-monthIED that exhibited only verbal aggression (IED-V), only physical aggression (IED-P) or both verbal and physical aggression (IED-B) in terms of socio-demographic, clinical and familial features as well as measurement scores.

The comparison of the sociodemographic, clinical, and familial characteristics of the IED-V, IED-P, and IED-B subgroups is shown in Table 6. The IED-B group had a significantly higher rate of lifetime suicide attempt than the other groups ($p = 0.028$). Significantly more participants in the IED-P and IED-B groups reported aggression/anger as a complaint when questioned during the clinical interview than those in the IED-V group ($p = 0.024$).

There were significant differences between the IED-P and IED-B groups in terms of total aggression ($p = 0.011$), physical aggression ($p = 0.001$), total impulsivity ($p = 0.028$), and motor impulsivity ($p = 0.043$) scores. Table 7 presents the comparison of aggression and impulsivity scores of participants with 12-month DSM-5 IED between the IED-V, IED-P, and IED-B groups. Furthermore, the same groups were compared in terms of lifetime comorbidity among participants with 12-month DSM-5 IED. This analysis revealed that childhood conduct disorder was significantly more common in the IED-B group ($p = 0.041$).

Logistic regression analysis was performed by creating a model with the demographic, clinical, and familial variables that showed significance in univariate analyses. Factors affecting lifetime DSM-5 IED are

**Table 2**
Clinical and familial characteristics of lifetime DSM-5 IED and non-IED groups.

| | IED (+) (n = 68) | IED (−) (n = 338) | p |
|---|---|---|---|
| Physical illness | 25 (37.7) | 103 (30.5) | p = 0.308 |
| Childhood trauma | 29 (42.6) | 100 (29.6) | **p = 0.035** |
| Psychiatric treatment | 34 (50.0) | 142 (42.0) | p = 0.225 |
| Lifetime suicide attempt | 24 (35.3) | 47 (13.9) | **p < 0.001** |
| Lifetime self-injurious behavior | 52 (76.5) | 96 (28.4) | **p < 0.001** |
| Psychiatric disorder in family | 25 (37.7) | 83 (24.6) | **p = 0.038** |
| Aggression/anger problem in family | 51 (75.0) | 137 (40.5) | **p < 0.001** |
| Lifetime suicide attempt in family | 9 (13.2) | 21 (6.2) | **p = 0.043** |
| Lifetime self-injurious behavior in family | 9 (13.2) | 25 (7.4) | p = 0.113 |

The numbers in parentheses represent column percentages.

**Table 4**
Self-reported aggression, anger and impulsivity scores of lifetime DSM-5 IED and non-IED groups.

| (n = 406) | IED(+), Mean ± SD | IED(−) Mean ± SD | p |
|---|---|---|---|
| BPAQ-Total | 60.1 ± 19.0 | 30.7 ± 17.7 | <**0.001** |
| BPAQ Physical Aggression | 14.4 ± 7.5 | 5.7 ± 5.2 | <**0.001** |
| BPAQ Verbal Aggression | 10.5 ± 6.4 | 6.1 ± 4.3 | <**0.001** |
| BPAQ Anger | 17.8 ± 5.4 | 9.5 ± 5.8 | <**0.001** |
| BPAQ Hostility | 17.6 ± 6.9 | 9.4 ± 6.7 | <**0.001** |
| BISTotal | 71.4 ± 11.9 | 61.8 ± 11.5 | <**0.001** |
| BIS Non-planning | 29.0 ± 5.2 | 26.5 ± 5.2 | <**0.001** |
| BIS Motor | 23.2 ± 5.7 | 19.5 ± 7.0 | <**0.001** |
| BIS Attentional | 19.3 ± 4.3 | 16.0 ± 4.0 | **0.001** |

BPAQ: Buss Perry Aggression Questionnaire; BIS: Barratt Impulsivity Scale.

**Table 5**
Comparison of DSM-5 diagnostic criteria of participants with lifetime DSM-5 IED according to gender.

| | Female (n = 26), n (%) | Male (n = 42), n (%) | p |
|---|---|---|---|
| A1 (verbal aggression) | 18 (69.2) | 22 (52.4) | 0.170 |
| A1 (physical aggression not resulting in destruction of property or physical injury) | 6 (23.1) | 10 (23.8) | 0.945 |
| A2 (damage or destruction of property) | 23 (88.5) | 36 (85.7) | 0.745 |
| A2(physical aggression resulting in physical injury) | 1 (3.8) | 13 (31) | **0.007** |
| Impairment | | | |
| Occupational functioning | 3 (11.5) | 22 (52.4) | **0.01** |
| Interpersonal difficulties | 26 (100) | 42 (100) | 1.0 |
| Financial problems | 22 (84.6) | 33 (78.6) | 0.54 |
| Legal consequences | 3 (11.5) | 12 (28.6) | 0.1 |

presented in Table 8. The prevalence of lifetime IED was 3.8 times higher in males than females (95% CI = 1.9–7.5); twice as high among individuals living in rural areas compared to those living in urban centers (95% CI = 1.1–3.7); 2.7 times higher in those with lifetime suicide attempt compared to those without (95% CI = 1.3–5.6); 4.5 times higher in those with lifetime self-injurious behavior versus those without (95% CI = 2.3–8.7); and 3 times higher in those with family history of aggression/anger compared to those without (95% CI = 1.5–5.9).

## 4. Discussion

The results of the present study revealed that 14.5% of participants referred to our outpatient clinic for the first time complained of aggression/anger as a main complaint, 40% reported having an aggression/anger problem if questioned during the clinical interview, 64% of the patient group described experiencing at least one aggression/anger episode with loss of control, 16% had sought treatment before for aggression/anger, and 16.7% of the patients met the diagnostic criteria for IED according to the DSM-5. These findings show that IED, which was considered rare until recently, is in fact a common disorder; however, it can easily be overlooked in clinical practice if not questioned directly because aggression and anger are not regarded as a priority by patients.

Community-based studies have reported that IED affects 1.5% to 9% of the population [3,4,8,9,11]. The lifetime prevalence rates of IED range from 1% to 4% in clinical studies [10,14–16]. Studies conducted in our country assessing impulse control disorders among different adult patient groups reported the lifetime prevalence of IED as 14.6%, 31.3%, and 15.8%, respectively [27–29]. Our results seem to be consistent with these studies. In addition, it was suggested that IED is common in the outpatient context and affects up to 6.3% of clinical samples [10]. On the other hand, the prevalence of IED is expected to be higher using the DSM-5 diagnostic criteria compared to previous versions due to the expansion in DSM-5 to include verbal aggression and allow for 'high-frequency/low-intensity' outbursts [8,21]. Our results meet these predictions as a clinically based study conducted in the outpatient setting. However, the difference between the IED prevalence rates we obtained using DSM-IV (16.3%) and DSM-5 (16.7%) criteria was not as high as expected. We noted that all of the patients in our study that met the DSM-5 physical aggression criterion also met the DSM-IV criteria, but not all patients with DSM-IV IED met the diagnostic criteria of physical aggression in DSM-5. This may be related to the fact that although the DSM-5 criteria are expanded, they are more restrictive in terms of time frame and frequency compared to the DSM-IV criteria. These data show that the prevalence determined in our study may be somewhat higher than previously reported. This might be attributable to the use of DSM-5 diagnostic criteria, the study setting, or the cultural and regional characteristics of the study sample.

As for demographic and clinical features, the prevalence of IED was higher among males and the age at onset was 16.4 years. These findings are also consistent with the literature [2,13]. Even in studies that demonstrate a significantly higher percentage in men, the difference is not usually as large magnitude as found in the current study. There were limited number of research of IED take account of cross-cultural factors and also gender differences, despite the fact that impulsivity and aggression exhibited by individuals are likely to be strongly affected by cultural circumstances. Although previous studies have shown that

**Table 6**
Comparison of sociodemographic, clinical, and familial variables in the IED subgroups.

| n (%) | IED-V (n = 4) | IED-P (n = 31) | IED-B (n = 35) | P |
|---|---|---|---|---|
| Age (years) (mean ± SD) | 33.0 ± 11.2 | 31.7 ± 13.6 | 30.7 ± 10.9 | 0.913 |
| Gender | | | | |
| Female | 0 (0) | 10 (37) | 17 (63) | 0.105 |
| Male | 4 (9.3) | 21 (48.8) | 18 (41.9) | |
| Education level | | | | |
| Elementary school | 2 (11.1) | 9 (50) | 7 (38.9) | 0.123 |
| High school | 1 (3.8) | 7 (26.9) | 18 (69.2) | |
| College | 1 (3.8) | 15 (57.7) | 10 (38.5) | |
| Physical illness | 0 (0) | 9 (36) | 16 (64) | 0.114 |
| Childhood trauma | 2 (6.9) | 10 (34.5) | 17 (58.6) | 0.381 |
| Psychiatric treatment | 2 (5.9) | 15 (44.1) | 17 (50.0) | 0.998 |
| Aggression/anger problem as a main complaint | 4 (12.5) | 14 (43.8) | 14 (43.8) | 0.074 |
| Aggression/anger problem reported if questioned | 4 (6.7) | 30 (50.0) | 26 (43.3) | **0.024** |
| Lifetime suicide attempt | 0 (0) | 7 (29.2) | 17 (70.8) | **0.028** |
| Lifetime self-injurious behavior | 3 (5.7) | 25 (47.2) | 25 (47.2) | 0.684 |
| Psychiatric disorder in family | 2 (7.7) | 11 (42.3) | 13 (50) | 0.852 |
| Presence of aggression/anger problem in family | 2 (3.8) | 22 (41.5) | 29 (54.7) | 0.248 |
| Lifetime suicide attempt in family | 1 (11.1) | 3 (33.3) | 5 (55.6) | 0.647 |
| Lifetime self-injurious behavior in family | 0 (0.0) | 0 (0.0) | **9 (100.0)** | – |

Analysis of the table was performed using ANOVA.

**Table 7**
Aggression and impulsivity scores of participants with 12-month DSM-5 IED in the IED-V, IED-P, and IED-B groups.

| Mean ± SD | IED-V (n = 21) | IED-P (n = 10) | IED-B (n = 15) | F | p |
|---|---|---|---|---|---|
| BPAQ-Total | 55.4 ± 18.5 | **61.0 ± 12.1** | **73.6 ± 17.5** | 5.053 | **0.011** |
| BPAQ Physical Aggression | 10.6 ± 6.4 | **15.6 ± 6.2** | **19.5 ± 7.1** | 8.069 | **0.001** |
| BPAQ Verbal Aggression | 10.6 ± 5.1 | 9.9 ± 4.9 | 12.9 ± 4.9 | 1.431 | 0.250 |
| BPAQ Anger | 17.5 ± 5.3 | 19.9 ± 2.8 | 19.0 ± 5.1 | 1.794 | 0.178 |
| BPAQ Hostility | 16.8 ± 7.1 | 17.0 ± 7.0 | 20.9 ± 5.7 | 1.896 | 0.162 |
| BIS Total | 68.5 ± 12.6 | **72.8 ± 10.0** | **79.5 ± 11.4** | 3.884 | **0.028** |
| BIS Non-planning | 28.5 ± 5.7 | 29.6 ± 4.0 | 31.7 ± 4.7 | 1.774 | 0.182 |
| BIS Motor | 21.4 ± 5.8 | **24.0 ± 4.3** | **26.6 ± 6.8** | 3.390 | **0.043** |
| BIS Attentional | 19.0 ± 4.1 | 19.1 ± 4.3 | 21.1 ± 3.4 | 1.423 | 0.252 |

Analysis of the table was performed using ANOVA. Significance is due to the difference between the groups written in bold. BPAQ: Buss Perry Aggression Questionnaire; BIS: Barratt Impulsivity Scale.

IED predominantly affects younger individuals [13], no significant difference was found between the ages of participants with or without IED in the present study. This might be a result of the age distribution of our sample. Young adults comprised the majority of both groups.

Previous studies have reported conflicting results regarding the relationship between IED and educational level, marital status, socioeconomic level, occupational status, and urban location [2]. In our study, we observed a significant association between living in rural areas and higher prevalence of IED. The limited social facilities in rural areas may act as an environmental factor in the development of impulsivity or aggression. Further research is needed to clarify this relationship.

Self-aggression such as suicide attempts and non-suicidal self-injury (NSSI) are more common among patients with IED. The lifetime prevalence of suicide attempts (18%) and NSSI (37%) in our population was similar to rates reported in other studies assessing self-aggression in cases of IED (8–25% for suicide attempts and 7–30% for NSSI) [6,22,25].

In addition, inclusion of verbal aggression in the DSM IED criteria has brought a new dimension to the type of episodes reported by patients. The current study compared IED patients with frequent verbal aggression only (IED-V), physical aggression only (IED-P), or both frequent verbal aggression and physical aggression (IED-B) in terms of demographic, clinical, and familial features, as well as psychometric scores. Those in the IED-B group were significantly more likely to have history of lifetime suicide attempt when compared to the other groups. Furthermore, physical aggression and motor impulsivity scores were higher in the IED-B group compared to the IED-P group. These findings are consistent with suggestions in the literature that individuals who experience both frequent verbal aggression and physical aggression had a more severe profile characterized by more frequent aggressive acts, higher trait anger, higher levels of anger expression, poorer control of anger expression, and greater affective lability [23].

**Table 8**
Factors affecting lifetime DSM-5 IED.

| | OR | p | 95% CI |
|---|---|---|---|
| Gender | | | |
| Female | 1.0 | <**0.001** | 1.9–7.5 |
| Male | 3.8 | | |
| Employment status | | | |
| Unemployed | 1.0 | 0.125 | 0.9–3.2 |
| Employed | 1.6 | | |
| Urbanicity | | | |
| Urban center | 1.0 | **0.029** | 1.1–3.7 |
| Rural areas | 2.0 | | |
| Childhood trauma | | | |
| No | 1.0 | 0.307 | 0.7–2.6 |
| Yes | 1.4 | | |
| Lifetime suicide attempt | | | |
| No | 1.0 | **0.006** | 1.3–5.6 |
| Yes | 2.7 | | |
| Lifetime self-injurious behavior | | | |
| No | 1.0 | <**0.001** | 2.3–8.7 |
| Yes | 4.5 | | |
| Aggression/anger problem in family | | | |
| No | 1.0 | **0.002** | 1.5–5.9 |
| Yes | 3.0 | | |
| Lifetime suicide attempt in family | | | |
| No | 1.0 | 0.598 | 0.5–3.5 |
| es | 1.3 | | |
| Constant: B = −4.525 p < 0.001 Exp (B) = 0.011 | | | |

Model: Gender, employment status, urbanicity, lifetime suicide attempt, lifetime self-injurious behavior, aggression/anger problem in family, childhood trauma, lifetime suicide attempt in family. OR: odds ratio, CI: confidence interval.

Aggressive behaviors and anger/aggression outbursts were reported to be more frequent in the families of psychiatric patients who suffer from anger/aggression problems [39]. Family studies conducted by Coccaro have shown that morbid risk for family members was higher for patients diagnosed with IED [20,40]. One of the notable findings of our study was that the prevalence of lifetime IED was 3 times higher in those who reported aggression/anger problems in their families compared to those who did not.

The present study revealed that 58% of participants with IED met the verbal aggression criterion, 24% met the criterion of physical aggression not resulting in destruction of property or physical injury, 85% met the damage or destruction of property criterion, and 20% of the group met the criterion of physical aggression resulting in physical injury. The fact that more than half of the IED patients in our study met the verbal aggression criterion highlights the clinical significance of frequent verbal aggression.

High scores for impulsivity, aggression, and psychopathology assessed by the BIS-11, BPAQ, and SCL-90 reflected an expected result for the cases with IED which have impulsivity and aggression as a main symptom as well as higher rates of comorbidity. Comorbidity rates of depression, anxiety disorders, and alcohol/substance related disorders in the IED group were 32%, 22%, and 9%, respectively. Although the comorbidity rates for depression and anxiety disorders were similar to those reported in the literature [3,4,13,41], our analysis revealed no significant differences between the IED and non-IED groups in terms of comorbidity of these disorders. This may be related to the characteristics of our sample. An additional factor leading to this result may be the fact that there are specialized clinics in Turkey for individuals with alcohol/substance-related disorders, and therefore these cases are rarely encountered in clinical practice.

Furthermore, consistent with previous research, our results demonstrate that participants in the IED group had higher rates of childhood trauma and personality disorders [3,41]. It is known that impulsivity, aggression, and anger are core features in many mental disorders such as oppositional defiant disorder, ADHD, and conduct disorder, which were grouped in DSM-IV under the heading of 'disruptive behavioral disorders', and impulsive aggression has also been observed in personality disorders [21,42]. Higher rates of comorbidity reported in the literature, early onset, and common core clinical features suggest a strong association between these disorders.

### 4.1. Limitations

There are several limitations of the present study. As mentioned above, the research was conducted as a cross-sectional study in an outpatient clinic of a tertiary-level general hospital with no comparison group, which makes our findings difficult to generalize to the public and the causality relation remains weaker. Another possible limitation is that the study was based on the participants' retrospective self-report. We attempted to overcome this limitation by corroborating the patients' self-reports with their significant others and relatives. Finally, including only a fraction of all the potential subjects referred to our clinic and selecting the first 4 patients which is not the ideal form of

randomization may have impacted the study findings and limited generalizability.

### 4.2. Conclusions

Although there is a growing body of data about IED, this is the first clinical study in Turkey to evaluate the diagnosis of IED. Considering that the DSM-IV diagnostic criteria and research criteria developed by Coccaro et al. were used in many previous studies in this field, the current study contributes to the limited number of studies that utilize DSM-5 diagnostic criteria. Our study revealed that approximately one in six respondents met the DSM-5 diagnostic criteria for lifetime IED. Statistically significant sociodemographic, clinical, and familial correlates of IED included gender, urbanicity, history of suicide attempts, history of self-injurious behaviors, and family history of aggression/anger problems. Future studies conducted in different populations will be instrumental in revealing regional and cultural differences in terms of clinical appearance, sociodemographic and familial characteristics, comorbidity, and impairment.

## Conflicts of interest statement

There was no conflict of interest on the part of either author in the conduct of this research or preparation of the manuscript.

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