

Impulse control disorders in elderly patients

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Abstract

Objective: There is no epidemiological study on the prevalence of impulse control disorders (ICDs) in the elderly population. The studies on ICDs in elderly patients are limited and some of them are case reports about pathological gambling and kleptomania. The comorbidity of other psychiatric disorders makes diagnosis difficult and has negative effects on both treatment and the prognosis of ICDs. The aim of this study was to determine the prevalence of ICDs among elderly patients and to evaluate the related sociodemographic and clinical features.

Method: A total of 76 patients aged 60 and over who have been referred to our outpatient clinics in a one-year period were included in the study. A demographic data form was completed. The Structured Clinical Interview for *Diagnostic and Statistical Manual of Mental Disorders, fourth edition* (DSM-IV) was used to determine axis I psychiatric disorders. The prevalence of ICDs was investigated by using the modified version of the Minnesota Impulse Disorders Interview (MIDI). Impulsivity was measured with the Barratt Impulsiveness Scale Version 11 (BIS-11). The Mini-Mental State Examination (MMSE) test was performed to evaluate the cognitive status of patients and to exclude the diagnosis of dementia. In addition, all patients completed Symptom Check List-90 (SCL-90).

Results: The prevalence rate of at least one comorbid ICD in our sample was 17%. When patients with a diagnosis of ICDs not otherwise specified (ICD-NOS) were included, the prevalence rate increased to 22.4%. The most common ICD was intermittent explosive disorder (15.8%), followed by pathological gambling (9.2%). The majority of the sample was men (54%), married (80%), had a high school education (51%), and mid-level socioeconomic status (79%). The only statistically significant difference between the sociodemographic characteristics of patients with or without ICDs was gender. The lifetime prevalence of ICDs was 34.1% in men and 8.6% in women. The prevalence of childhood conduct disorder was significantly higher in the group with ICD. There was no statistically significant difference in the number of suicide attempts, history of physical illness and family history of psychiatric disorders between the groups with or without ICDs. Comorbidity of alcohol/substance abuse was found to be 17.6% in patients with ICD whereas no cases were found in the group without ICD.

Conclusion: The result of this study has shown that approximately one fifth of patients over 60 years had at least one lifetime ICD comorbidity. The prevalence rates of ICDs seem to decrease with aging. The male gender and childhood conduct disorder are related with higher prevalence rates of ICDs in elderly.

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1. Introduction

Impulsivity can be defined as taking action, making decisions and tending to act quickly on impulse rather than thought. Eysenck associated impulsivity with taking risks, lack of planning, and making up one's mind quickly [1]. Patton et al. separated impulsivity into three components including motor activation, attention and not planning [2]. Impulsivity can be a characteristic of normal behavior or a

psychopathological part of many mental disorders (i.e., conduct disorder, attention deficit hyperactivity disorder (ADHD), substance-alcohol abuse/dependence, personality disorders, bipolar disorder, and eating disorders) [1,3,4]. Impulse control disorders (ICDs) are characterized by impulsivity, failure to resist on impulse; the drive or temptation to harm oneself and/or others; an increasing sense of tension or excitement before acting out; and a sense of pleasure, gratification, or release at the time the act is committed or shortly thereafter [5].

DSM-IV-TR includes the category, “impulse control disorders not elsewhere classified”, which consists of kleptomania, pathological gambling, pyromania, trichotillomania, intermittent explosive disorder, and “impulse control

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disorders not otherwise specified (ICD-NOS)". Other ICDs are compulsive skin picking, compulsive buying, compulsive exercise, compulsive internet usage disorder and compulsive non-paraphilic sexual behavior [6,7].

The prevalence changes according to particular ICD [7]. Almost all present studies examining the rates of ICDs have been conducted on adult or adolescent populations. In a study that investigated the lifetime prevalence and age-of-onset distributions of DSM-IV disorders, the lifetime prevalence of ICDs was found as 24.8% and the age of onset of ICDs was 11 years. In that study, the ICDs were categorized as oppositional-defiant disorder, ADHD, conduct disorder, intermittent explosive disorder and any ICD [8].

There is no specific epidemiologic study of ICDs on the elderly population. The age of onset of ICDs is usually at adolescence and early adulthood. In a review that searched the age of onset of mental disorders, it was reported that ICDs (categorized as oppositional-defiant disorder, ADHD, conduct disorder, intermittent explosive disorder) have the earliest age of onset distributions and it was emphasized that half of all lifetime intermittent explosive disorder begins in childhood or adolescence [9]. If ICD is left untreated, it may become chronic and may continue into old age. It is therefore estimated that the prevalence of ICDs does not change in the elderly population. The impulsivity decreases as the patient gets older but this does not mean that ICDs are rare in these ages. Grant reported that the prevalence of pathological gambling and compulsive buying does not change but that compulsive sex is rare in the elderly population [10].

Bipolar, anxiety, somatoform, sleep and sex disorders, depression, schizophrenia, alcohol and substance abuse and other psychiatric disorders induced by organic causes are common in the elderly population [11–13]. Previous research has shown that the prevalence of psychiatric disorders among people without dementia aged 65 years and over is almost 20% [14]. However this figure does not include ICDs, as almost all of these studies did not evaluate presence of ICDs except for intermittent explosive disorder.

If the ICD occurs in old age, the impulsivity is as severe as it is in early ages. The severity of impulsivity is thought to be related to the balance between the activity of frontal lobe and basal part of brain. Dementia, cerebral tumors and electrolyte imbalances can also cause impulsivity and should be excluded in the evaluation of ICDs [10].

The studies on ICDs in elderly patients are limited to several case reports about pathological gambling and kleptomania [15,16]. The comorbidity of other psychiatric disorders may complicate the diagnosis and has negative effects on both treatment and the prognosis of ICDs.

The aim of this study was to determine the prevalence of ICDs among elderly patients and evaluate the related sociodemographic and clinical features which would fill the gap in this area.

2. Methods

2.1. Study setting and subjects

The study was conducted between December 2009 and December 2010 at outpatient clinic of 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 surrounding provinces. After the approval of the study protocol by the institutional review board, written informed consent was obtained from all participants. The sample of current study included 90 consecutive elderly patients aged 60 and over who were recruited from the outpatient clinic of the Department of Psychiatry, Cukurova University Medical School. This was the total number of cases older than 60 years of age who applied to our outpatient clinics during this period. The absence of a specialized geriatric outpatient clinic serving only the elderly patients limited the number of patients we have included in the current study.

Of the 90 patients approached, 14 were excluded from the study. Six of the participants were unable to provide adequate information, 4 did not give written informed consent, 2 had acute symptoms of mania and psychosis and the other 2 patients had symptoms of dementia (Mini-Mental State Examination (MMSE) score was lower than or equal to 24 points). Other exclusion criteria were; having diagnosis of dementia, Parkinson disease, other neurodegenerative disorders, mental retardation, neurological illnesses like multiple sclerosis and having significant cognitive impairment. Due to these factors the resulting sample size was 76 (35 female, 41 male) patients.

Socio-demographic variables (i.e. age, gender, marital status, education, socioeconomic status, employment, physical illnesses) were obtained from a demographic data form completed by the patient. Furthermore, another demographic data form completed by a clinician according to the interviews with patients, examined the psychiatric diagnosis, the onset and period of disease, hospitalization, alcohol and substance use, familial and medical histories and suicide attempts.

2.2. Procedures and assessment instruments

All patients were interviewed using the Turkish version of the Structured Clinical Interview for DSM-IV (SCID-I) to confirm Axis I psychiatric disorders [17]. The SCID-I examines both current and lifetime Axis I psychiatric disorders according to the DSM-IV [18]. Along with the SCID interview, a detailed psychiatric interview was conducted to obtain further information regarding socio-demographic features, and the familial and medical history of the patients. Axis I diagnosis in patients with or without ICDs was categorized into five different groups (i.e.: mood disorders, anxiety disorders, substance use disorders including alcohol use disorder, somatoform disorder and adjustment disorders.) according to DSM-IV[6].

The presence of lifetime ICDs was evaluated with a modified Turkish version of the Minnesota Impulse Disorders Interview (MIDI) [19] and an assessment using the DSM-IV criteria if available. MIDI is a 36-item semistructured interview that includes separate screening modules for exploring the DSM-IV criteria for ICDs (i.e., pathological gambling, intermittent explosive disorder, trichotillomania, kleptomania, pyromania, compulsive buying, compulsive sexual behavior and compulsive exercise) [19]. In the MIDI, for ICDs already covered in the DSM-IV, patients were asked questions mirroring the DSM criteria after a general screening question were answered in the affirmative. However, for the other disorders that have not been included yet in the DSM (i.e., compulsive sexual behavior and compulsive exercise) but reviewed under the rubric of the ICD not otherwise specified (NOS), the questions in the MIDI determine the presence of increasing tension before the related act followed by relief after the completion of the act, the level of distress, and the presence of functional impairment. Another ICD compulsive buying was diagnosed according to criteria of McElroy et al. [20].

All patients completed the Turkish version of the Barratt Impulsiveness Scale Version 11 (BIS-11) for the assessment of different aspects of impulsivity [21]. BIS-11 [2] is a self-report questionnaire that uses a 3-factor impulsivity model that includes both motor and cognitive impulsivity. BIS-11 includes 30 items 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). The evaluation of BIS-11 gives 4 different sub-scores; total score, nonplanning activity, attentional (cognitive) impulsivity and motor impulsivity. The Turkish version of BIS-11 has been found to be valid and reliable, presenting similar psychometric properties to the original version of BIS-11.

The Mini-Mental State Examination (MMSE) test was performed to evaluate the cognitive status of patients and exclude the diagnosis of dementia. MMSE is grouped into five subscales: orientation (time, place), registration, attention and calculation, recall and language [22] and is completed by interviewer. The Turkish version of the MMSE [23] has been found to be highly reliable and valid and the cut-off point is 23/24. In this study the patients whose MMSE score was lower than or equal to 24 points were excluded.

In addition, all patients completed Symptom Check List-90 (SCL-90). SCL-90 is used to evaluate psychological symptoms. The symptom dimensions that are determined are somatization, anxiety, obsessive–compulsive, depression, interpersonal sensitivity, hostility, phobic anxiety, paranoid ideation, psychoticism, and additional items [24]. The Turkish version of SCL-90 had sufficient reliability [25].

2.3. Statistical analysis

Descriptive statistical analyses were carried out for the evaluation of demographic and clinical characteristics of the

entire group. The Chi-square test and Fisher's exact test were used to analyze categorical variables and the t-test was used for the comparison of parametric continuous variables. 95% confidence intervals were provided for prevalence rates of ICDs in this sample. All *P* values were two-tailed, and statistical significance was set as $P < 0.05$.

3. Results

The sample included 76 of 90 patients (35 female, 41 male) aged 60 and over who were referred to our outpatient clinics during one-year period. The majority of the sample was men (54%), married (80%), had a high school education (51%), and mid-level socioeconomic status (79%). All were unemployed (including housewives) or retired. For statistical purposes, two divorced patients were included in unmarried (single) group.

The lifetime prevalence rate for all comorbid ICDs was 22.4% ($n = 17$) in this sample. When the ICD-NOS is excluded, the lifetime prevalence rate decreases to 21.1 ($n = 16$). The most common ICD was intermittent explosive disorder (15.8%), followed by pathological gambling (9.2%). None of the cases met the criteria for kleptomania, pyromania, trichotillomania and compulsive exercise in their lifetime or in the last one month period. Also there were no cases meeting the criteria for compulsive buying and pathologic gambling currently. Table 1 presents the lifetime and current prevalence of ICDs in elderly patients.

The sociodemographic and clinical characteristics of the patients with and without lifetime comorbid ICDs are presented in Table 2. The only statistically significant difference between sociodemographic characteristics of patients with or without ICDs was gender. The lifetime prevalence of ICDs was 34.1% in men and 8.6% in women ($p = 0.008$). The lifetime prevalence of intermittent explosive disorder (24.4% in males, 5.7% in females) and pathological gambling (17.1% in males, 0% in females)

Table 1
Current and lifetime prevalences of impulse control disorders among 76 elderly psychiatric outpatients.

	Current			Lifetime		
	N	%	95% CI (%)	N	%	95% CI (%)
ICD(+) (without ICD-NOS)	3	3.9	0	16	21.1	11.88–30.22
ICD(+) (with ICD-NOS)	5	6.6	1.01–12.15	17	22.4	
Intermittent explosive disorder	3	3.9	0	12	15.8	7.59–23.99
Pathologic gambling	0	0		7	9.2	2.71–15.71
ICD-NOS (+) (at least one)	2	2.6	0	3	3.9	0
Compulsive buying	0	0		1	1.3	0
Pathological skin picking	1	1.3	0	1	1.3	0
Compulsive sexual behavior	1	1.3	0	1	1.3	0

ICD: Impulse Control Disorder; ICD-NOS: Impulse Control Disorder not otherwise specified; CI: Confidence Intervals.

Table 2

Demographic and clinical features of elderly psychiatric outpatients with or without a comorbid lifetime impulse control disorder.

	ICD (+) (n = 17)	ICD (–) (n = 59)	P
Age (years)	67 ± 7.88	65.9 ± 5.30	t = 0.661 p = 0.514
Age groups (N %)			
60–64	9 (23.7)	29 (76.3)	x = 4.15 p = 0.125
65–69	1 (5.9)	16 (94.1)	
>70	7 (33.3)	14 (66.7)	
Gender (N %)			
Female	3 (8.6)	32 (91.4)	x = 7.11 p = 0.008
Male	14 (34.1)	27 (65.9)	
Marital status			
Married	13 (21.3)	48 (78.7)	p = 0.732
Single	4 (26.7)	11 (73.3)	
Education level			
Elementary school	7 (18.9)	30 (81.1)	x = 0.494 p = 0.482
Higher education	10 (25.6)	29 (74.4)	
Economic status			
Low	7 (43.8)	9 (56.3)	p = 0.059
Middle/high	10 (16.7)	50 (83.3)	

P value indicates the comparison between ICD (+) and ICD (–) group.

was higher among males than females. There was no statistically significant difference between the other socio-demographic characteristics like age, education level, economic or marital status. ($p > 0.05$).

The prevalence rate of childhood psychiatric disorders in this sample was 9.2% ($n = 7$). The prevalence of childhood conduct disorder was significantly higher in the group with ICD ($p = 0.01$) (17.6% in ICD (+), 0% in ICD (–) group). There was no statistically significant difference in the number of suicide attempts, history of physical illness and family history of psychiatric disorders between the groups with or without ICDs. Table 3 presents the comparison of family and medical history of elderly patients with or without ICDs.

Table 3

The comparison of family and medical history of elderly patients with or without a comorbid lifetime impulse control disorder.

n (%)	ICD (+) (n = 17)	ICD (–) (n = 59)	χ	P
The history of childhood psychiatric disorder	4 (23.5)	3 (5.1)		0.041
ADHD	0 (0)	0 (0)		
Enuresis–encopresis	1 (5.9)	0 (0)		0.224
Separation anxiety	0 (0)	3 (5.1)		1
Conduct Disorder	3 (17.6)	0 (0)		0.01
The history of physical illness	9 (52.9)	37 (62.7)	0.527	0.468
The history of psychiatric disorder in family	3 (17.6)	11 (18.6)		1
Anxiety disorders	0 (0)	3 (5.1)		1
Somatoform disorders	1 (5.9)	0 (0)		0.224
Alcohol/substance use disorders	1 (5.9)	2 (3.4)		0.538
Psychotic disorders	0 (0)	2 (3.4)		1
Depression	1 (5.9)	1 (1.7)		0.400
Bipolar disorder	1 (5.9)	3 (5.1)		1
Suicide attempt	0 (0)	1 (1.7)		1

ADHD: Attention deficit hyperactivity disorder.

Table 4

Comorbidity of Axis I psychiatric disorders elderly patients with or without a comorbid lifetime impulse control disorder.

n (%)	ICD (+) (n = 17)	ICD (–) (n = 59)	p
Prevalence of comorbidity	13 (76.5)	48 (81.4)	0.732
Mood Disorders	9 (52.9)	32 (54.2)	0.925
Bipolar I Disorder	1 (5.9)	1 (1.7)	0.400
Depression	8 (47.1)	31 (52.5)	0.690
Alcohol/substance use disorder	3 (17.6)	0 (0)	0.01
Anxiety Disorders	5 (29.4)	15 (25.4)	0.760
Panic Disorder	2 (11.8)	8 (13.6)	1
OCD	0 (0)	3 (5.1)	1
PTSD	1 (5.9)	0 (0)	0.224
GAD	2 (11.8)	6 (10.2)	1
Somatoform disorders	0 (0)	6 (10.2)	0.328
Adjustment disorder	0 (0)	1 (1.7)	1

P value indicates the comparison between ICD (+) and ICD (–) group. OCD: Obsessive–compulsive disorder. PTSD: Post-traumatic stress disorder. GAD: Generalized anxiety disorder.

The comorbidity of alcohol/substance abuse was higher in ICD (+) group (17.6% in patients with ICD, 0% in patients without ICD, $p = 0.01$). There is no statistically significant difference between the comorbidity of other Axis I psychiatric disorders in elderly patients with or without ICDs. Table 4 presents the comorbidity of Axis I psychiatric disorders in ICD (+) and ICD (–) groups.

3.1. Psychometric Scales

All general factors and subscale scores of SCL-90 except for somatization subscale were statistically higher in ICD (+) group. There were significant differences between ICD

Table 5

Comparison of psychometric tests between elderly patients with or without a comorbid lifetime impulse control disorder.

	ICD (+)	ICD (–)	t	p
SCL-GSI	1.45 ± 0.62	0.88 ± 0.51	3.84	<0.0001
SCL-PSI	61.8 ± 15.3	43.9 ± 20.7	3.32	<0.001
SCL-PSDI	2.09 ± 0.63	1.75 ± 0.54	2.14	0.036
SCL-SOM	1.36 ± 0.77	1.05 ± 0.63	1.69	0.095
SCL-Anxiety	1.35 ± 0.71	0.79 ± 0.66	3.07	0.003
SCL-OK	1.72 ± 0.64	1.05 ± 0.60	4.00	<0.0001
SCL-Depression	1.56 ± 0.87	1.01 ± 0.71	2.69	0.009
SCL-IS	1.57 ± 0.83	0.79 ± 0.62	4.19	<0.0001
SCL-Psychoticism	1.23 ± 0.93	0.59 ± 0.49	3.75	<0.0001
SCL-PI	1.61 ± 0.87	0.75 ± 0.62	4.60	<0.0001
SCL-Hostility	1.49 ± 1.00	0.70 ± 0.61	4.00	<0.0001
SCL-PA	0.98 ± 0.67	0.47 ± 0.55	3.25	0.002
SCL-AI	1.65 ± 0.73	1.15 ± 0.72	2.51	0.014
BIS-Total	63.2 ± 8.75	56.4 ± 9.39	2.66	0.01
BIS-NPA	19.2 ± 5.99	14.4 ± 4.49	3.54	0.001
BIS-MI	20.8 ± 5.92	17.3 ± 4.21	2.78	0.007
BIS-AI	23.9 ± 5.37	24.7 ± 5.85	–0.514	0.609

SCL: Symptom check list-90; GSI: Global severity index. PSI: Positive symptom index. PSDI: Positive symptom distress index. SOM: Somatization OK: Obsessive–compulsive. IS: Interpersonal sensitivity. PI: Paranoid ideation. PA: Phobic anxiety; BIS: Barratt impulsiveness scale NPA: Non-planning MI: Motor impulsiveness. AI: Attentional impulsiveness.

(+) and ICD (–) groups in terms of total impulsivity, nonplanning activity, and motor impulsivity scores as determined by BIS-11 ($p < 0.05$). There was no statistically significant difference between the two groups in attentional impulsivity score. Table 5 presents the comparison of psychometric tests (SCL-90 and BIS-11) between the ICD (+) and ICD (–) groups.

4. Discussion

The results of present study revealed that 21.1% of elderly patients referred to our outpatient clinics had at least one lifetime comorbid ICD based on DSM-IV criteria. The current prevalence rate of ICDs (within the last one month of evaluation) was only 6.6% and if ICD-NOS excluded, this rate decreases to 2.6%. The prevalence rates of ICDs seem to decrease with aging. There is no study on ICDs in the elderly population so we were able to compare our results only with previous studies on adult patients.

Previous studies reported mixed results for age differences between patients with ICDs. Müller et al. and Lejoyeux et al. indicated that the patients with ICDs were younger than patients without ICDs in their sample group. On the other hand, Grant et al. did not find any age difference between adult psychiatric patients with or without ICD [26–29].

In the literature, the lifetime prevalence rate of ICDs ranges from 23.5% to 37.8% among psychiatric inpatients [26,27,30]. In a recent study on 791 college students, 10.45% of the participants had at least one lifetime ICD according to DSM-IV [31]. In our study the lifetime prevalence of ICDs (22.4%) is similar with the literature but the current prevalence (3.9%) is less than the prevalence rate that has been reported for adult patients (18.8%–30.9%) [26,27]. This supports the research that reported impulsivity and that ICDs decrease with aging [32]. The psychiatric and neurologic disorders that cause impulsivity (ADHD, personality disorder, bipolar disorder, substance abuse/dependency) begin in early ages and in most of these disorders the prominent symptoms relieve as the patient gets older.

Impulsivity, especially physical and verbal aggression is a common symptom in patients with dementia [1]. The dementia was an exclusion criterion in our study so this may be one of the reasons of low prevalence rates of ICDs in our sample.

In a study that was performed on 204 psychiatric inpatients it was reported that 63 of these patients had at least one ICD but only 3 of participants (1.5%) had a primary admission diagnosis of an ICD [26]. Müller et al. related the underdiagnosis of ICDs with busy inpatient units, interpreting the symptoms of ICDs as a part of other mental disorders, the ICD-NOS category which isn't formally included in DSM and the legal consequences of these disorders [27]. Similarly, in the present study only one patient was referred for inappropriate sexual behavior and then received the diagnosis of compulsive sexual behavior.

In the current study, the most common ICD type was intermittent explosive disorder (15.8%), followed by pathological gambling (9.2%). None of the cases had the diagnosis of pyromania, trichotillomania and kleptomania. These findings are parallel with a French study which reported that pyromania and kleptomania are rare disorders among alcohol dependent patients [29]. In contrast to this study, Grant et al. found kleptomania to be one of the most common ICDs [26].

The lifetime prevalence of IED (15.8%) in our population was similar with the rate reported in a group of psychiatric inpatients (14.6%) [27] and in another group of depressed psychiatric inpatients (16.8) [28]. However it was quite higher than the lifetime prevalence rate of intermittent explosive disorder in adult inpatient groups reported by Grant et al. and Müller et al. (6.9%, 5.6%) [26,27]. In two studies carried out in our country, the lifetime prevalence of intermittent explosive disorder was found to be 31.3% in patients with major depression and 6.5% in patients with bipolar I disorder [33,34]. Coccaro et al. reported the lifetime prevalence of intermittent explosive disorder to be 6.3% in a community sample [35]. The one-month prevalence rates of intermittent explosive disorder in our study (3.9%) were consistent with the rates that Coccaro et al. found in individuals aged 55 and over. Coccaro also emphasized that aggressive behavior in patients with intermittent explosive disorder declined after the fifth decade [35]. The number of cases included the distribution of psychiatric disorders and the heterogeneity of sample groups may be the reason for these different rates.

The research about pathological gambling in the elderly population is limited. In the current study, the second most common ICD was pathologic gambling (9.2%) and there was no case that had the diagnosis of pathologic gambling in the last one month. This result is consistent with rates described in previous reports. Grant et al. reported the lifetime prevalence of pathologic gambling among adult patients as 6.9% [26] and Tamam et al. gave a similar rate; 6.8% in a similar age group [30]. The prevalence rate of pathologic gambling was found to be 0.42% in a study on a large sample group in the United States and it was determined that there was a significant association between pathological gambling and alcohol use disorder [37].

There was one female case of compulsive buying, one male case of compulsive sex and another of compulsive skin picking in our sample. Koran et al. reported the point prevalence of compulsive buying as 5.8% in the United States and indicated that compulsive buyers were younger [38]. In a study that investigated skin picking disorder in a sample of 1916 university students, it was found that skin picking disorder is common in both genders but more common in female than male and the prevalence rate was 4.2% [39]. In the present study, the only case of compulsive skin picking was male and the lifetime prevalence rate was found to be 1.3%. These low rates in our sample can be explained by small size of our sample and reduction in impulsivity with aging.

The only statistically significant difference between sociodemographic characteristics of patients with or without ICDs was gender. The lifetime prevalence of ICDs was 34.1% in men and 8.6% in women. When ICD-NOS was excluded, these rates decreased to 5.7% for women however no change was observed in male patients (34.1%). Pathological gambling and intermittent explosive disorder were found to be more common in men (24.4%, 17.1% in men and 5.7%, 0% in women) and this might be the reason for the different rates between men and women. These findings are in parallel with the literature.

In the current study, the prevalence of childhood conduct disorder was significantly higher in the group with ICD. (17.6% in ICD(+) group and 0% in ICD(−) group) and there was no statistically significant difference in the number of suicide attempts, history of physical illness and family history of psychiatric disorders between the groups with or without ICDs. This result can be interpreted as impulsivity being a symptom of childhood conduct disorder. In a study that was performed on 1130 adolescents aged 12–19, it was found that there was a strong comorbidity between gambling behaviors and ADHD [40].

In the current study we could not find any association between ICDs and the comorbidity of Axis I disorders except for alcohol and substance abuse. Comorbidity of alcohol/substance abuse was found to be 17.6% in patients with ICD whereas there were no cases in ICD(−) group. In a study that was performed on alcohol dependent patients, the prevalence rate of ICDs was 38% [29]. Previous studies reported that ICDs are more common in patients with depression and bipolar-I disorder than the normal population. Lejoyeux et al. reported the prevalence rate of ICDs in patients with depression as 28.9% [36] and Annagür et al. gave a rate of 34.7% [33]. In another study carried out by our group, we found prevalence rate of ICDs in bipolar disorder as 27.4% [34]. There was no difference between groups in the rates of depression and bipolar disorder in our study which might be related to the small size and high average age of our sample.

The level of general psychopathology was significantly higher in the ICD (+) group. ICDs can cause a significant morbidity and can be treated with pharmacotherapy and/or psychotherapy. So it can be suggested that the diagnosis of ICDs affects the treatment and prognosis of comorbid disorders.

The BIS-11 has been frequently used to measure impulsivity. We found a significant difference between the ICD (+) and the ICD (−) groups in terms of total impulsivity and non-planning and motor impulsivity scores as determined by the BIS-11, and this result is consistent with previous reports. However, there was no statistically significant difference between the two groups in terms of attentional impulsivity score in the present study.

4.1. Limitations

There are several limitations of this study. As mentioned in methods section, we conducted the study in a tertiary level

general hospital psychiatry outpatient clinic. There were no specialized geriatrics outpatient clinics which limited our sample size. Absence of a control group within the same age is another limitation which makes our findings difficult to generalize to the general public or the entire psychiatric population. However as there is no such similar study in the literature, these findings and study may play frontier roles for our studies.

4.2. Conclusions

Although there are a growing number of research about the prevalence of ICDs in the normal population and clinic samples in recent years, research about ICDs in elderly patients is still limited. The results of this study have shown that approximately one fifth of patients over 60 years have at least one ICD and suggest ICDs are under-diagnosed in clinical routine. Although impulsivity decreases as the patient gets older, ICDs remain to affect the quality of life, the course and outcome of comorbid disorders. Thus it is important to recognize, diagnose and treat ICDs in elderly patients by asking relevant questions or using appropriate questionnaires in regular interviews.

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