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ORIGINAL ARTICLE

Lifetime prevalence, sociodemographic predictors, and comorbidities of oppositional defiant disorder: the National Epidemiology of Iranian Child and Adolescent Psychiatric disorders (IRCAP)

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Objective: This was the first national epidemiological study on oppositional defiant disorder (ODD) in Iran, which provided new information about the prevalence, comorbidities, and sociodemographic predictors of ODD.
Methods: Data from a face-to-face household survey of 30,532 children and adolescents aged 6-18 years were collected from across all 31 provinces of Iran using a multistage cluster sampling design. The Persian version of the Kiddie Schedule for Affective Disorders and Schizophrenia for School-Age Children – Present and Lifetime Version (K-SADS-PL) was used in this study.
Results: The lifetime prevalence of ODD was found to be 3.9%. ODD was significantly more common in boys than girls and appeared in late adolescence more frequently than in childhood. A lower prevalence of ODD was found among participants who lived in rural areas. ODD is highly likely to co-occur with attention deficit hyperactivity disorder, separation anxiety disorder, generalized anxiety disorder, and depressive disorders.
Conclusions: The findings of this national population-based study confirm and extend previous findings on the prevalence, comorbidities, and sociodemographic predictors of ODD.

Keywords: Oppositional defiant disorder (ODD); comorbidity; prevalence; Iran

Introduction

Oppositional defiant disorder (ODD) is one of the most prevalent psychiatric disorders among children and is diagnosed through the following characteristics: a pattern of angry or irritable mood, argumentative or defiant behavior, or vindictiveness during childhood or adolescence.[1,2] Although there are many overlaps between

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ODD and conduct disorder,[3,4] ODD includes emotional dysregulation problems and less severe behaviors than conduct disorder.[1] The predictors of ODD include low socioeconomic status, poor social functioning, higher levels of stress and family conflict, parental depression, poor family cohesion, harsh parenting or coercive physical punishment, insecure attachment, low parental acceptance, and parental hostility.[5-7]

The ODD prevalence rate has been reported as 1.4-16% in population-based samples and 28-50% in clinical samples.[2,6,8] ODD is more common in boys than in girls[3,6,8] and is more prevalent among younger participants; ODD prevalence decreases in late childhood and adolescence in both genders.[3,9] Moreover, ODD is the most prevalent psychiatric disorder in Iran, with reported rates of 4.45% among children and adolescents in five populous provinces.[10] To date, no national epidemiological study has been conducted to show the current prevalence, sociodemographic predictors, and comorbidities of ODD in Iran.

Previous research has reported that 92.4% of individuals with ODD have another psychiatric disorder[9] and have a worse prognosis than those with ODD alone.[11] ODD has strong comorbidity with conduct disorder, attention deficit hyperactivity disorder (ADHD), substance use disorders, and mood and anxiety disorders.[2,7,12-14] It is more associated with internalizing disorders, since individuals with ODD have emotional dysregulation problems.[2] More than 50% of those with ODD meet the criteria for anxiety disorders and nearly 50% have a mood disorder.[9]

The goal of this study was to present national epidemiological data that estimate the lifetime prevalence, sociodemographic predictors, and comorbidity of ODD with other conditions among Iranian children and adolescents. Additionally, ODD comorbidity patterns were examined according to age and gender. This study can provide new information on ODD for researchers, clinicians, and healthcare policymakers.

Methods

Sample

Data were obtained from the National Epidemiology of Iranian Child and Adolescent Psychiatric Disorders (IRCAP). A face-to-face household survey of 30,532 Persian-speaking children and adolescents aged 6-18 years was conducted in all 31 provinces of Iran using a multistage cluster sampling design. A total of 1,000 children and adolescents were randomly selected from urban and rural areas in each province of Iran according to postal codes. A total of 170 blocks were randomly collected. Six participants were selected from each cluster head: three of each gender from different age groups (6-9, 10-14, and 15-18 years); we categorized age groups according to World Health Organization parameters.[15] The population proportion of each province was then weighted. The response rate was 92%.

The participants included adolescents aged 11-18 years and the parents of those younger than 11 years old. They were interviewed by trained psychologists using the Persian version of Kiddie Schedule for Affective Disorders and Schizophrenia for School-Age Children – Present and Lifetime Version (K-SADS-PL). Sociodemographic factors, including gender, age, type of settlement, education level of the mother and father, and history of psychiatric hospitalization of the mother and father were collected.

Assessment

The K-SADS-PL is a semi-structured psychiatric interview based on the DSM-IV criteria and includes mood disorders, psychotic disorders, anxiety disorders, conduct disorder, ODD, ADHD, eating disorders, elimination disorders, and tic disorder. The reliability and validity of ODD diagnosis by the Persian version of the K-SADS-PL have been reported as 0.81 and 0.92, respectively.[16]

Statistical analysis

The data were analyzed using SPSS version 20. Descriptive data are presented as frequency, percentage, mean, and standard deviation. The sociodemographic predictors of ODD were used to estimate associations with ODD using logistic regression analysis. In addition, comorbidities of ODD with other psychiatric disorders were examined using logistic regression analysis based on gender and age. The data were adjusted based on population weighting for each province. P-values less than 0.05 were considered statistically significant.

Ethics statement

This study was approved by the research ethics committee of the National Institute for Medical Research Development (NIMAD; Tehran, Iran; ref. IR.NIMAD.REC. 1395.001). Full details of the method are available in the study protocol.[17] Data can be requested from the first author (MRM) upon reasonable demand and by permission of the NIMAD.

Results

A total of 30,532 children and adolescents participated in this survey, and 29,832 individuals responded to the ODD module. No significant differences were observed in sociodemographic predictors of ODD between respondents and non-respondents. The lifetime prevalence of ODD was estimated at 3.9%. According to the univariate and multivariate analysis, significant differences were observed in the sociodemographic characteristics of ODD, including gender, age, type of settlement, mother's education, and mother's history of psychiatric hospitalization (Table 1).

ODD was significantly less prevalent among girls than boys (odds ratio [OR] = 0.70, 95% confidence interval (95%CI) = 0.60-0.82, $p < 0.01$). A total of 457 girls (3.2%) and 667 boys (4.6%) were diagnosed with ODD. As demonstrated in Table 1 and Figure 1, ODD was significantly more common among 15-18-year-olds than among 6-9-year-olds

Table 1 Distribution of the study participants' sociodemographic characteristics based on univariate and multivariate analysis

Sociodemographic characteristics	Total, n (%)	With ODD disorders		Logistic regression model, OR (95%CI)	
		n (crude percent)	Weighted percent (95%CI)	Univariate	Multivariate
Gender					
Boy	14,601 (48.9)	667 (4.6)	4.6 (4.2-5.04)	Baseline	
Girl	15,231 (51.1)	457 (3)	3.2 (2.9-3.6)	0.69 (0.6-0.8)*	0.70 (0.60-0.82)*
Age (years)					
6-9	10,168 (34.1)	332 (3.3)	3.6 (3.2-4.1)	Baseline	
10-14	10,447 (35)	393 (3.8)	3.7 (3.3-4.2)	1.02 (0.85-1.23)	1.03 (0.86-1.2)
15-18	9,217 (30.9)	399 (4.3)	4.6 (4.0-5.1)	1.23 (1.01-1.48)*	1.28 (1.07-1.54)*
Type of settlement					
Urban	24,878 (83.4)	974 (3.9)	4.1 (3.8-4.4)	Baseline	
Rural	4,954 (16.6)	150 (3)	2.7 (2.1-3.5)	0.61 (0.46-0.83)*	0.67 (0.51-0.88)*
Father's education					
Illiterate	1,289 (4.5)	51 (4)	3.5 (2.4-5.1)	Baseline	
Primary education	4,633 (16.1)	206 (4.4)	4.2 (3.5-5.0)	1.22 (0.78-1.89)	1.16 (0.83-1.63)
Secondary or higher education	6,400 (22.3)	263 (4.1)	4.1 (3.5-4.7)	1.17 (0.76-1.81)	1.06 (0.75-1.5)
College diploma	8,367 (29.1)	288 (3.4)	3.7 (3.3-4.2)	1.07 (0.70-1.63)	0.91 (0.63-1.31)
Bachelor's degree	6,067 (21.1)	208 (3.4)	4 (3.4-4.6)	1.15 (0.74-1.76)	0.96 (0.65-1.4)
Master's or higher degree	1,971 (6.9)	60 (3)	3.4 (2.5-4.5)	0.97 (0.59-1.59)	0.92 (0.58-1.44)
Missing	1,105				
Mother's education					
Illiterate	1,693 (5.8)	75 (4.4)	3.7 (2.7-5.1)	Baseline	
Primary education	5,482 (18.9)	241 (4.4)	4.3 (3.6-5.1)	1.18 (0.81-1.73)	0.99 (0.73-1.32)
Secondary or higher education	5,679 (19.6)	242 (4.3)	4.8 (4.1-5.5)	1.31 (0.9-1.9)	0.95 (0.70-1.3)
College diploma	8,367 (29.1)	350 (3.6)	3.7 (3.3-4.2)	1.01 (0.71-1.45)	0.85 (0.62-1.17)
Bachelor's degree	6,067 (21.1)	181 (3.2)	3.9 (3.3-4.5)	1.05 (0.72-1.53)	0.77 (0.54-1.09)
Master's or higher degree	1,971 (6.9)	22 (2.2)	2 (1.2-3.3)	0.51 (0.27-0.96)†	0.53 (0.31-0.91)†
Missing	1,105				
History of psychiatric hospitalization					
Father					
Yes	107 (0.4)	8 (7.5)	6.9 (2.7-16.4)	Baseline	
No	29,725 (99.6)	1,116 (3.8)	3.9 (3.6-4.2)	0.62 (0.21-1.81)	0.74 (0.25-2.21)
Mother					
Yes	88 (0.3)	10 (11.4)	17.5 (10-28.6)	Baseline	
No	29,744 (99.7)	1,114 (3.7)	3.9 (3.6-4.2)	0.19 0 (0.1-0.37)*	0.19 (0.1-0.38)*
Total	29,832 (100)	1,124 (3.8)	3.9		

OR (95%CI) = odds ratio (95% confidence interval); ODD = oppositional defiant disorder.
*$p < 0.01$; †$p \leqslant 0.05$.

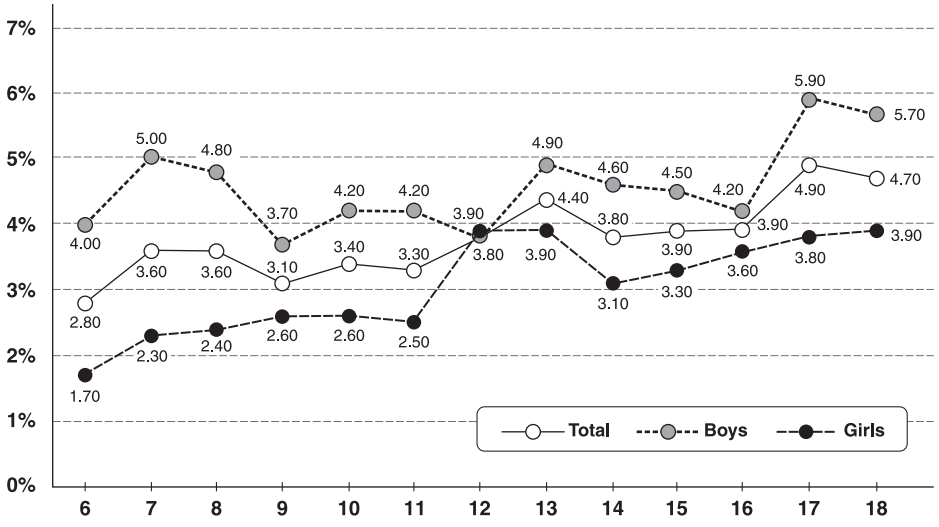

Figure 1 Rates of oppositional defiant disorder by age and gender.

(OR = 1.23, 95%CI = 1.01-1.48, p < 0.01). ODD was significantly less common among rural than urban participants (OR = 0.61, 95%CI = 0.46-0.83, p < 0.01). Moreover, ODD was significantly less prevalent among those whose mothers had a Master's degree or higher (OR = 0.53, 95% CI = 0.31-0.91, p < 0.01). Additionally, participants whose mothers had no history of psychiatric hospitalization were less likely to experience ODD than those who did (OR = 0.19, 95%CI = 0.1-0.38, p < 0.01) (Table 1).

Of the participants with ODD, 71.4% met the criteria for at least one other psychiatric disorder. As shown in Table 2, ODD is much more likely to co-occur with ADHD (28.9%), separation anxiety disorder (20.3%), generalized anxiety disorder (14.9%), or depressive disorders (13.9%). However, it is not likely to occur with bulimia nervosa (0.3%), encopresis (0.4%), panic disorder, or autism (0.5%).

As shown in Table 3, compared to boys, higher prevalence rates for mood disorders and anxiety disorders, as well as a lower prevalence rate for behavioral disorders, were found among girls with ODD. Among 15-18-year-olds with ODD, mood disorders, psychotic symptoms, and substance abuse disorders were significantly more common, although anxiety disorders and behavioral disorders were significantly less prevalent. Mood disorders were significantly more prevalent and behavioral disorders were significantly lower among 10-14-year-olds with ODD than among 6-9-year-olds with ODD (Table 3).

Table 2 Psychiatric disorder comorbidity rates in children and adolescents with oppositional defiant disorder

Psychiatric disorders	n (%)	95%CI
Mood		
Depressive	156 (13.9)	11.98-16.02
Mania	15 (1.3)	0.8-2.18
Hypomania	21 (1.9)	1.23-2.84
Psychotic		
Psychosis	28 (2.5)	1.73-3.58
Anxiety		
Panic	6 (0.5)	0.24-1.15
Separation anxiety	228 (20.3)	18.03-22.73
Social phobia	90 (8.0)	6.56-9.74
Specific phobias	121 (10.8)	9.09-12.72
Agoraphobia	107 (9.5)	7.94-11.38
Generalized anxiety	167 (14.9)	12.9-17.06
Obsessive compulsive	123 (10.9)	9.25-12.9
Post-traumatic stress	44 (3.9)	2.92-5.21
Behavioral		
Attention deficit hyperactivity	318 (28.9)	25.73-30.99
Conduct	129 (11.5)	9.75-13.48
Tic	55 (4.9)	3.78-6.31
Neurodevelopmental		
Autism	6 (0.5)	0.24-1.15
Mental retardation	40 (3.6)	2.63-4.81
Epilepsy	60 (5.3)	4.17-6.81
Substance abuse		
Smoking	95 (8.5)	6.96-10.22
Alcohol abuse	14 (1.2)	0.75-2.09
Elimination		
Enuresis	140 (12.5)	10.66-14.52
Encopresis	4 (0.4)	0.14-0.92
Eating		
Anorexia	0 (0.0)	0.00-0.00
Bulimia	3 (0.3)	0.09-0.79
Total comorbid	795 (71.4)	0.68-0.73

95%CI = 95% confidence interval.

Discussion

This study was nationally representative, covered an extensive age range in both genders, and presented findings on comorbidities separately for age- and gender-specific groups of children and adolescents. The findings confirmed and extended previous reports. A lifetime ODD prevalence of 3.9% was observed, being significantly more common in boys than in girls. However, gender differences in ODD are not considered similar to those in conduct disorder or ADHD.[3,8,18] In contrast with previous studies, ODD was significantly more common in late adolescence than childhood.[9,19] However, Nock et al.[9] reported that ODD has an ascending trend with increased age. The inconsistency of the present study with previous reports should be studied. The present findings also highlight the need for early intervention to prevent ODD repercussions in adolescence.

Although the present results indicate that rural residence was a protective factor, with a lower ODD prevalence among rural than urban participants, Lopez-Villalobos et al.[19] reported a higher ODD prevalence in rural areas. However, several studies have demonstrated that more risk factors and difficulties exist for urban than rural populations.[20] Moreover, urban males reported more conflict and externalizing behaviors.[21] Thus, community and family networks in rural areas can protect children and adolescents against behavioral and emotional problems and delinquency.[22] Since communities are moving toward urbanization, it can be understood that increased urbanization is associated with increased ODD prevalence.

Mothers play a key role in child-rearing in Iran. In this study, it was found that having a mother with a Master's degree or higher and/or a mother with no history of psychiatric hospitalization were protective factors for ODD in children and adolescents. Additionally, a positive family history of psychiatric hospitalization could represent biologic/genetic predisposition. Previous studies have demonstrated that mothers with lower educational levels had a lower quality of life and were more likely to have children with oppositional defiant symptoms.[23] Likewise, psychiatric problems, such as depressive and anxiety disorders, interpersonal difficulties, negative emotions, and hostility, were reported in mothers of children with ODD,[24] which could be considered a consequence or cause of ODD.

The majority of children and adolescents with ODD had at least one other psychiatric disorder. ADHD had the greatest degree of comorbidity with ODD, which confirmed the results of previous studies.[3,11,12,14] Although some studies have considered ODD as a type of ADHD, others disagree, reporting that ODD and ADHD symptoms develop in parallel,[25] i.e., the close coincidence of

Table 3 Psychiatric disorder comorbidity rates in children and adolescents with oppositional defiant disorder by age and gender – based on logistic regression model

Psychiatric disorders	Total n (%), (95%CI)	Sex	n (%)	OR (95%CI)	Age group	n (%)	OR (95%CI)
Mood	166 (14.8), (12.82-16.96)	Male Female	74 (11.6) 92 (20.8)	Baseline 2 (1.43-2.79)*	6-9 10-14 15-18	25 (8.0) 49 (12.9) 92 (24.0)	Baseline 1.71 (1.03-2.83)* 3.64 (2.27-5.83)*
Psychotic	28 (2.5), (1.73-3.58)	Male Female	18 (2.7) 10 (2.3)	Baseline 0.63 (0.38-1.8)	6-9 10-14 15-18	3 (0.9) 12 (3.1) 13 (3.3)	Baseline 3.46 (.97-12.34) 3.69 (1.04-13.08)†
Anxiety	474 (42.2), (39.31-45.08)	Male Female	26 (40.7) 214 (49.9)	Baseline 1.45 (1.13-1.86)*	6-9 10-14 15-18	154 (48.4) 162 (44.4) 158 (41.0)	Baseline 0.85 (0.63-1.15) 0.74 (0.55-1.00)†
Behavioral	421 (37.5), (34.68-40.33)	Male Female	283 (43.1) 138 (31.4)	Baseline 0.61 (0.47-0.78)*	6-9 10-14 15-18	150 (46.6) 143 (37.4) 128 (32.7)	Baseline 0.67 (0.51-0.93)† 0.56 (0.41-0.75)*
Neurodevelopmental	88 (7.8), (6.40-9.55)	Male Female	54 (8.2) 34 (7.6)	Baseline 0.92 (0.59-1.44)	6-9 10-14 15-18	27 (8.3) 29 (7.5) 32 (8.1)	Baseline 0.91 (0.52-1.56) 0.98 (0.57-1.67)
Substance abuse	99 (8.8), (7.29-10.61)	Male Female	65 (10.3) 34 (8)	Baseline 0.75 (0.49-1.16)	6-9 10-14 15-18	7 (2.3) 17 (4.6) 75 (19.9)	Baseline 2.10 (0.86-5.13) 10.82 (4.91-23.86)*
Elimination	141 (12.5), (10.73-14.60)	Male Female	94 (14.3) 47 (10.5)	Baseline 0.70 (0.48-1.02)	6-9 10-14 15-18	61 (18.8) 47 (12.1) 33 (8.4)	Baseline 0.60 (0.39-0.90) 0.39 (0.25-0.62)
Eating	3 (0.3), (0.09-0.08)	Male Female	1 (0.2) 2 (0.5)	Baseline 2.95 (0.27-32.61)	6-9 10-14 15-18	- - 3 (0.8)	Baseline - -

OR (95%CI) = odds ratio (95% confidence interval).
*$p < 0.01$; † $p \leqslant 0.05$.

ODD and ADHD reflect two separate disorders that frequently co-occur.

Furthermore, in line with previous reports, strong comorbidities were found in this study between ODD and separation anxiety disorder, generalized anxiety disorder, and depressive disorders.[2,3,9,12,13] These findings show that ODD is closely related to separation anxiety disorder and generalized anxiety disorder, but not panic disorder, which can be justified by addressing abnormalities in different brain regions and considering different psychopathological pathways.[26,27]

Adjusted ORs of comorbidities for ODD were reported separately for gender and age-specific groups of children and adolescents in this study, which had not been assessed and presented in detail in previous studies.[2,3] Higher prevalence rates of mood and anxiety disorders and lower prevalence rates of behavioral disorders were found among girls with ODD than boys with ODD, confirming previous studies that reported more internalizing comorbidities in girls and more externalizing comorbidities in boys with ODD.[2,18,28] Boys may be more exposed to risk factors than girls for behavioral disorders, such as biological vulnerabilities and parental behaviors,[18] and likewise in the case of girls for mood and anxiety disorders.[28]

In line with prior reports, mood disorders, psychotic disorders, and substance abuse disorders were significantly more common among 15-18-year-olds with ODD; however, anxiety disorders and behavioral disorders were significantly less prevalent among them.[1,2,29,30] Similarly, mood disorder rates were significantly higher among 10-14-year-olds with ODD than among 6-9-year-olds with ODD. Previous studies have shown that biological and psychological factors can produce higher depression rates at the onset of puberty, especially among adolescent girls.[29] However, behavioral disorder rates were significantly lower among 10-14-year-olds with ODD, which is consistent with previous findings.[1,29]

Since few studies have been conducted to explain ODD comorbidity findings based on gender and age, this issue should be examined and extended in future studies.

In conclusion, this study provided new information about the prevalence, comorbidities, and sociodemographic predictors of ODD for researchers, clinicians, and healthcare policymakers. Data were collected from a face-to-face household survey of 30,532 children and adolescents aged 6-18 years from all provinces of Iran, based on a multistage cluster sampling design using the K-SADS-PL.

The sociodemographic predictors and comorbidities of ODD were estimated by logistic regression analysis, and the results showed that 3.9% of the sample met DSM-IV criteria for ODD. ODD was more common among boys and in late adolescence and was less prevalent in rural areas. Having a mother with a Master's degree or higher and/or a mother with no history of psychiatric

hospitalization were protective factors for ODD in children and adolescents.

Of participants with ODD, 71.4% met the criteria for at least one other psychiatric disorder. Moreover, ODD was highly likely to co-occur with ADHD, separation anxiety disorder, generalized anxiety disorder, and depressive disorders. Therefore, since ODD is common among children and adolescents, more attention should be paid to providing preventive and treatment programs for ODD.

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Conflicts of interest

The authors report no conflicts of interest.

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