



ORIGINAL ARTICLE

# Sociodemographic and Clinical Features of Obsessive Compulsive Disorder in a Large Sample of Children and Adolescents from Turkey

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## ABSTRACT

**Objective:** Obsessive compulsive disorder (OCD) is a time-consuming and chronic disorder characterized by obsessions and compulsions that can start before age of eighteen and can be associated with significant impairments in academic, social and family functioning. In this study, our aim was to evaluate sociodemographic characteristics, clinical pictures and comorbid diagnoses of a large sample of children and adolescents who were diagnosed with OCD according to diagnostic criteria of DSM-IV-TR in a child and adolescent psychiatry outpatient clinic of a University Hospital.

**Methods:** Patients who were first diagnosed at the study center with OCD according to DSM-IV-TR criteria were included. For inclusion, the primary diagnosis should be OCD as per DSM-IV-TR criteria and there must be concordance between at least 2 clinicians (one resident and the head of department) for diagnosis.

**Results:** 440 cases were included in our study and the most common obsessions in our sample were contamination with dirt (48.8%), and exactness (23.8%) and most common compulsions were ordering/checking (42.4%) and washing/cleaning (32.0%). Most of the patients in our sample (78.0%) had a comorbid diagnosis and most common comorbidities were Attention- Deficit/ Hyperactivity Disorder (26.6%) and Generalized Anxiety Disorder (20.5%).

**Discussion:** Accordingly, our results in terms of comorbidity, obsessions and compulsions are consistent with the literature. In conclusion, this is the largest study on a clinical sample of pediatric OCD from Turkey that we are aware of in terms of sample size, time frame and statistical power.

**Keywords:** Obsessive-compulsive disorder, obsession, compulsion, comorbidity

## INTRODUCTION

Obsessive compulsive disorder (OCD) is characterized by obsessions and/ or compulsions. "Obsessions" are defined

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as repetitive, distressing and egodystonic ideas, impulses and images while "compulsions" are overt/ covert acts to reduce the anxiety caused by obsessions and to avoid the feared consequences. Previously classified among anxiety disorders, OCD is now a part of the "Obsessive compulsive and related disorders" section in DSM-5 (1, 2) along with trichotillomania, body dysmorphic disorder, and hoarding disorder (2).

OCD can start prior to 18 years of age, is chronic and displays an episodic course. Lifetime prevalence among

pediatric populations is reported to be 2-4% with a slight (3:2) male preponderance and increased familial load. Pediatric OCD is also more frequently comorbid with other disorders with up to 80% of patients also meeting criteria for attention-deficit/ hyperactivity disorder (ADHD), generalized anxiety disorder (GAD) and tic disorders (3).

Like adult patients with OCD, most common obsessions among children are reported to be contamination/ cleanliness while most common compulsions are washing/ cleaning albeit with developmental variations (i.e.. changing content with adolescence, greater secrecy and reassurance seeking) (3). Retrospective studies found that approximately one-third to one-half of adult patients with OCD report onset in childhood or adolescence (3, 4).

Previous studies on pediatric samples from different countries reported rates of OCD as varying from 1.8 -4.1% (5-9) while the rate of sub-clinical OCD symptoms may reach 19%. Most studies support a slight male preponderance (9, 10). Also, according to those studies comorbid psychiatric diagnoses may be found in 85% of the samples with most common diagnoses being generalized anxiety, separation anxiety and major depressive disorders. Most common obsessions in those studies were those of contamination/ dirt while the most common compulsions included those of cleaning/ washing.

Studies on epidemiology of pediatric OCD in Turkey are scarce (4). In one study Diler and Avci (11) reported that among a clinical sample of 9-15 years old children the rate of OCD was 2.7 % and that only 15% of their sample reported obsessions and/ or compulsions among their chief complaints. Demirok and colleagues (12) reported that 125 cases of pediatric OCD presented to the Child and Adolescent Psychiatry (CAP) Department of Hacettepe University between 1984 and 1994, although they did not report the rate of cases. Similarly, Vural and colleagues (13) reported 40 cases diagnosed during 4 years of clinical workload of the CAP department of another university hospital without reporting rates. Lastly, another study on a clinical sample of youth in Ankara reported a 6-month rate of OCD as 1.5% (14).

Palulu and Erol (15) report the prevalence of OCD symptoms in a large (n=1762) community sample of Turkish youth as 10.4% according to self-reports. However, their methodology did not include a requirement for dysfunction or direct clinical interviews. Among community studies involving structured, face-to-face interviews prevalence of pediatric OCD was found to be 5.1% and 9.9% in Bursa (16, 17) and 6.9% in Elazig (18). The corresponding rates for sub-threshold OCD were 5.1%, 9.9% and 18.4%; respectively (16-18). Among a random community sample of 361 high school junior students in Istanbul prevalence of current OCD according to SCID-I interview was 3.9% while lifetime prevalence was 4.2% (19). A further 3.0% of the sample had subclinical OCD while another 0.3% was classified as being in remission (19). Abay and colleagues reported the point prevalence of OCD among high school students in Edirne city center as 1.4% (20).

As for comorbidity in clinical samples, the reported rates for Turkish studies vary from 34.4% to 71.2% (4, 11-14). Most common comorbid diagnoses were major depressive disorder (MDD) (29.8%-47.5%) (11, 13) GAD (5.0%-9.0%) (11, 13, 14) and ADHD (4.3%-11.8%) (11, 13, 14). Male: female ratios in those samples varied from 0.9 to 1.9 with mean ages of patients varying from 11.7 to 12.1 years (4, 11-14). Pure obsessions in clinical samples of pediatric OCD from Turkey were reported from 8.8% to 29.0% (4, 11-14) while patients with both obsessions and compulsions formed 39.2% to 100.0% depending on samples (4, 11-14]. Most common obsessions in clinical samples were contamination (40.0%-48.9%) (11, 13) while most common compulsions differed among studies with some reporting control (22.5%), (13) while others report cleaning (68.1%) (11).

Considering the scarcity of those reports, further studies on diverse samples of Turkish youth with OCD are needed. Therefore, the aim of this descriptive chart review study without control group is to evaluate sociodemographic characteristics, familial characteristics, clinical pictures and comorbid diagnoses of a large sample of children and adolescents who were diagnosed with OCD according to diagnostic criteria of DSM-IV-TR in a

child psychiatry outpatient clinic of a University Hospital and to examine the impact of these factors on clinical characteristics of OCD.

## METHODS

Prior to the study, approval was obtained from the ethics committee of Mersin University School of Medicine. Informed consent was obtained from all participants and/ or their legal guardians and the study was conducted in accordance with the principles set forth in Declaration of Helsinki and National Code of Clinical Research. This retrospective chart review study was conducted at the Mersin University School of Medicine, Department of Child and Adolescent Psychiatry. Patients who were first diagnosed at the study center with OCD according to DSM-IV-TR criteria were included. For inclusion, the primary diagnosis should be OCD as per DSM-IV-TR criteria and there must be concordance between at least 2 clinicians (one resident and the head of department) for diagnosis. The hospital database was searched for patients with ICD-10 code F42.0 and obsessive- compulsive symptoms in psychotic disorders (F20.0) and in depression (F32.0-F33.0) were excluded (21). As a result, 440 patients were included (22). The obsessions/ compulsions should be the primary complaints, should not be observed during an episode of depression/ psychosis and the patients should have complete hospital records for inclusion.

### Measurements

#### Sociodemographic data

Pre-, peri- and post-natal information, chief complaints, history of present illness, past medical history, family history (medical/ psychiatric), developmental milestones and referral information were systematically recorded at intake interviews.

#### Maudsley obsessive-compulsive symptom checklist (M-OCSL)

M-OCSL is a 30-item self-report scale to assess the presence and severity of symptoms of Obsessive Compulsive Disorder (OCD). The questions are answered

in a True/ False format. The original form has "control", "cleaning", "slowness" and "doubt" subscales allowing evaluation in those dimensions. In the translation process 7 items from the MMPI were added to the original scale to bring the total to 37 items. The Turkish version was found to be reliable and valid with a Cronbach alpha of 0.86. Test- retest reliability was 0.88. Factor analysis revealed a three- factor structure for the Turkish version (i.e., cleaning- punctiliousness, obsessive thoughts/ rumination and slowness/ checking). No cut-off score was calculated for the Turkish version and it was suggested to be used in comparative studies. In this study, M-OCSL was filled by children themselves as well as their parents (for preschool children) and correlations among M-OCSL subscale scores and total scores varied from 0.58 ("rumination") to 0.83 ("control", for all  $p=0.00$ ) (23, 24).

#### Children's depression inventory

CDI is a 27-item, self- report scale for evaluating symptoms of depression among 6-17 years old children. The items all have 3-point Likert type choices (i.e., 1="Rarely", 2="Frequently", 3="Always") which are scored between 0-2 points. The scores are assumed to correspond to the severity of depressive symptoms with the highest score being 54. The cut-off corresponding to clinically significant depressive symptoms was reported to be 19. The Turkish version of CDI was previously found to be reliable and valid in clinical and community samples. In this study, CDI was filled by children themselves as well as their parents (for preschool children) (25, 26).

#### State- trait anxiety inventory-child version

This likert-type self-report scale was developed by Spielberger and colleagues (27). It has two subscales of 20 items evaluating state and trait anxiety. Total scores for both subscales range from 20 to 80 and scores are assumed to correlate with anxiety levels. Item- total correlations for STAI-T-C Turkish version varied from 0.34 to 0.72 while Cronbach alpha was found to be 0.87. Test-retest reliability coefficient was found to be 0.71-0.86. Consequently, the Turkish version of STAI- C was judged to be reliable and valid. In this study, the trait subscale was

filled by children themselves as well as their parents (for preschool children) (27, 28).

### Statistical analysis

As this study was a retrospective chart review study, no a priori power analysis was undertaken. The records were recorded to a database prepared via Statistical Package for Social Sciences (IBM SPSS Statistics, Version 22.0, 2013). Univariate assumptions of normality were evaluated via Kolmogorov-Smirnov test. Missing values are reported as percentages and presence of patterns in missing data are analyzed via Little's MCAR test and expectation maximization (EM) methods. Bivariate analyses were conducted with chi square, Mann-Whitney U and Student's t tests depending on normality. Chi square test for trends and Fisher's exact test was used when needed. Effect sizes are reported in phi, Cohen's d and r values (29). Bivariate correlations were conducted via Spearman's correlation and partial correlations were also reported. Variances explained were reported as R<sup>2</sup>. P was set at 0.05 (two-tailed).

### Data availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

## RESULTS

### Sociodemographic characteristics

Within the specified period 440 children (57.3% male) with a mean age of 11.1 years (SD=3.4; Range=2-18 years) were diagnosed with OCD. Mean ages for male and female children were; 11.0 (SD=3.3) and 11.2 (SD=3.5) years; respectively with no statistically significant difference (t test for independent groups,  $p>0.05$ ). Most of the sample (70.2%) was primary and secondary school students while 19.1% were high school students. A minority was either attending kindergarten or was not receiving education. Patients with OCD were generally first (54.5%) or second children of their families (30.7%).

Mean ages for mothers and fathers of diagnosed children were 38.2 (SD=6.1) and 42.4 (SD=6.4) years, respectively. The corresponding ages for female children were 38.4 (SD=6.2) and 42.6 (SD=6.7) years while those for male children were 38.0 (SD=6.0) and 42.3 (SD=6.2) years, respectively. Mean parental ages did not differ between female and male children (t test,  $p>0.05$ ). Other socio-demographic features of children diagnosed with OCD are listed in Table 1.

The most common maternal psychopathologies for the whole sample according to self-report were; depressive disorders (13.4%), OCD (10.7%); bipolar disorder (1.6%) and panic disorder (1.5%). The most

**Table 1: Sociodemographic features of children with obsessive compulsive disorder**

n, %	Male (n=252)	Female (n=188)	p <sup>‡</sup>
Self-referred	81.8% (206)	81.9% (154)	0.96
Maternal education high school/ university	65.5% (165)	60.6% (114)	0.51
Maternal occupation (yes)	37.7% (95)	37.8% (71)	0.99
Maternal chronic medical disorder (yes)*	16.7% (42)	13.8% (26)	0.42
Maternal psychopathology requiring treatment <sup>†</sup>	24.2% (61)	33.5% (63)	0.03
Paternal education high school/ university	70.2% (177)	72.9% (137)	0.16
Paternal occupation (yes)	96.4% (243)	96.3% (181)	0.93
Paternal chronic medical disorder (yes)*	11.9% (30)	14.9% (28)	0.36
Paternal psychopathology requiring treatment <sup>†</sup>	20.2% (51)	17.0% (32)	0.39
Living with both parents	87.7% (221)	87.8% (165)	0.77
Consanguineous marriage	14.7% (37)	13.3% (25)	0.68

\*According to self-report, any medical disorder for which treatment of at least 6 months is needed; †: According to self-report, ‡: Chi-square test.

common paternal psychopathologies on the other hand were listed as; OCD (7.5%), Alcohol Use Disorders (4.1%), depressive disorders (3.4%) and psychotic disorders (1.4%). Male and female children differed significantly in terms of maternal self- reported psychopathology (Chi Square= 4.6, dF=1, p=0.03). This difference had a small effect size (Phi=0.10).

For the whole sample, 18.2% of the mothers reported a stressful pregnancy while 11.8% reported either pre (i.e., 24-37 weeks) or post-term labor (>42 weeks). Most of the deliveries were uneventful while 36.5% were via caesarean section and/ or required assistance. Most of the patients experienced no delivery complications while those were reported in 11.1%. Most of the mothers breastfed their babies while 6.6 % did not. Features of pregnancies and deliveries for children diagnosed with OCD were listed in Table 2. Female patients diagnosed with OCD were significantly less likely to be breastfed compared to male children (Chi square=4.8, dF=1, p=0.03). This difference had a small effect size (Phi=0.11). For the whole sample of patients with OCD mean duration of breastfeeding was 9.6 months (SD=8.6). This did not differ significantly between genders (females: 9.2±7.7 months vs. males: 9.9±9.4 months, t (434.3)= -0.85, p=0.4).

Developmental milestones of children were recorded according to parental report and included mean months of 12.9 (SD=4.3), 19.6 (SD=9.7) and 24.1 (SD=12.6) for walking, word onset and toilet training; respectively. Developmental milestones according to genders are listed in Table 3.

Male patients with OCD in our sample had significantly later word onset and toilet training compared to females. Mean differences and 95% confidence intervals for those developmental milestones were 2.8 (4.6-0.95) and 2.4 (4.7-0.0) months; respectively. Effect sizes for those were moderate and small, respectively (Cohen's d=0.29 and 0.19).

Stressful experiences (i.e. rural to urban migration, inter-parental violence, spanking the child, chronic medical illnesses requiring treatment for at least 6 months) predating application to the department were screened according to self- report of parents and children. For the

**Table 2: Features of pregnancies and deliveries for children with obsessive compulsive disorder**

N, %	Male (n=252)	Female (n=188)	p <sup>‡</sup>
<b>Pregnancy stress</b>	16.3% (41)	20.8% (39)	0.23
<b>Term labor</b>	87.7% (221)	88.8% (167)	0.44
<b>Normal delivery</b>	65.1% (164)	61.2% (115)	0.57
<b>Delivery complications</b>	13.1% (33)	8.5% (16)	0.13
<b>Breastfeeding</b>	95.6% (241)	90.4% (170)	0.03

‡: Chi square test.

**Table 3: Developmental milestones of children with obsessive compulsive disorder**

Mean (SD); months	Male (n=252)	Female (n=188)	p <sup>‡</sup>
<b>Walking</b>	13.1 (4.0)	12.6 (4.5)	0.25
<b>Word onset</b>	20.8 (9.0)	18.0 (10.2)	0.00
<b>Toilet training</b>	25.1 (13.3)	22.8 (11.5)	0.05

‡: t test for independent groups.

**Table 4: Psychometric evaluations of children with obsessive compulsive disorder**

Mean (SD)	Male (n=165)	Female (n=127)	p <sup>‡</sup>
<b>CDI</b>	11.6 (7.1)	14.0 (8.0)	0.01
<b>STAI-T</b>	37.6 (8.1)	41.1 (7.7)	0.00
<b>M-OCSL-rumination</b>	2.0 (1.4)	2.3 (1.3)	0.03
<b>M-OCSL-doubt</b>	4.2 (1.6)	4.7 (1.7)	0.01
<b>M-OCSL- slowness</b>	3.1 (1.7)	3.6 (1.7)	0.02
<b>M-OCSL- cleaning</b>	4.9 (2.1)	5.5 (2.3)	0.03
<b>M-OCSL- control</b>	4.0 (2.1)	4.5 (2.3)	0.06
<b>M-OCSL- Total</b>	17.7 (6.2)	20.1 (6.4)	0.00

CDI: Children's Depression Inventory, STAI-T: State- Trait Anxiety Inventory- Trait, M-OCSL: Maudsley Obsessive- Compulsive Symptom Checklist. ‡: Student's t test.

whole sample those were ranked as; spanking (30.5%), chronic medical illness (26.4%), migration (22.0%) and inter-parental violence (6.1%). Mothers were the primary agents for spanking their children (66.2%). Most common medical comorbidities in children with OCD were bronchial asthma (33.9%), febrile convulsions (17.9%) and epilepsy (8.9%). Male children with OCD had significantly higher medical comorbidity predating their application for treatment (Chi Square= 4.4, dF=1, p=0.04) although

the effect size was small ( $\Phi=0.10$ ). Other stressful experiences did not differ for genders.

### Clinical characteristics

The mean duration of obsessive-compulsive symptoms in our sample was 49.9 months ( $SD=23.2$ ) with no significant difference between genders. The median number of obsessions and compulsions for the whole sample was 1.0 ( $IQR=1.0$ ) and 1.0 ( $IQR=2.0$ ), respectively. The median number of both obsessions and compulsions were significantly higher in female children with OCD (Mann-Whitney U test,  $Z=-2.3$ ,  $p=0.02$  and  $Z=-2.5$ ,  $p=0.01$ ). Both differences had small effect sizes ( $r=0.17$  and  $0.18$ ; respectively). The most common obsessions in our sample were; contamination with dirt (48.8%), doubt/exactness (23.8%), harm (9.2%), religious/scrupulosity (5.9%) and unwanted sexual thoughts (3.9%). The most common compulsions were; ordering/checking (42.4%), washing/cleaning (32.0%), reassurance seeking (2.1%) and repeating (0.9%). Both washing/cleaning (Chi Square=5.8,  $p=0.02$ ) and ordering/checking (Chi Square=5.4,  $p=0.02$ ) was significantly more common among males although the effect size was small ( $\Phi=0.11$ ). Similarly, contamination with dirt and exactness were significantly more common among females with a small effect size (Chi square=5.6,  $p=0.02$ ,  $\Phi=0.11$  for both). Other obsessions and compulsions did not differ significantly between genders.

Most of the patients in our sample (78.0%) had a comorbid diagnosis with 46.8% having one and 31.1% having 2 comorbidities. The median number of comorbidities was 2.0 (Inter-quartile Range=1.0). The most common comorbidities were ADHD (26.6%), GAD (20.5%), MDD (9.8%), Tic Disorders (9.5%), elimination disorders (5.7%) and intellectual disability/mental retardation (4.8%) in order of frequency. A significant difference was found between girls and boys in terms of comorbid disorders ( $p=0.01$ ). Male patients in our sample with OCD had significantly more common ADHD (Chi=34.7,  $p=0.00$ ) and tic disorder (Chi=12.9,  $p=0.00$ ) diagnoses. All those differences had small effect sizes ( $\Phi=0.28$  and  $0.17$ , respectively). Female patients in our sample had significantly more common MDD comorbidity (Chi=7.8,  $p=0.01$ ) again with a small effect size ( $\Phi=0.13$ ).

They also tended to have more common GAD comorbidity albeit without reaching significance ( $p=0.07$ ).

### Psychometric measures

CDI, STAI-T and M-OCSL data were missing for 33.4%, 31.4% and 35.0% of the samples, respectively. Those with missing data were significantly younger (Mann-Whitney U test,  $Z=-8.1$ ,  $p=0.000$ ) with a moderate to large effect size ( $r=0.39$ ). Missing data on self-report scales was also significantly associated with paternal psychopathology (Chi Square=5.1,  $p=0.02$ ) although with a small effect size ( $\Phi=0.11$ ). None of the other sociodemographic and clinical features differed significantly between those with missing data and those without.

For the whole sample with available data mean scores on CDI, STAI-T and M-OCSL were 12.7 ( $SD=7.6$ ), 39.1 ( $SD=8.1$ ) and 18.7 ( $SD=6.4$ ); respectively. The corresponding scores with expectation maximization were 12.6 ( $SD=7.6$ ), 39.1 ( $SD=8.1$ ) and 18.7 ( $SD=6.4$ ). Little's MCAR test revealed no significant pattern to missing scores (Chi square=6.8,  $df=9$ ,  $p=0.66$ ). There were two extremely high scores each for M-OCSL and CDI (i.e. more than 97th percentile, 0.7%) while for STAI-T two cases scored extremely low (below 3rd percentile, 0.7%) and one case with extremely high scores (more than 97th percentile, 0.3%). Kolmogorov-Smirnov test with Lilliefors correction revealed that CDI, STAI-T and M-OCSL scores were not normally distributed for the whole sample ( $p=0.00$ ,  $0.02$  and  $0.03$ ; respectively.)

The age of patients correlated significantly with CDI scores ( $r=0.18$ ,  $p=0.00$ ) while CDI scores were correlated with STAI-T ( $r=0.56$ ,  $p=0.00$ ) and M-OCSL ( $r=0.46$ ,  $p=0.00$ ) scores. When age of patients was controlled for correlation of CDI scores with STAI-T ( $r=0.55$ ,  $p=0.00$ ) and M-OCSL ( $r=0.37$ ,  $p=0.00$ ), these correlations remained significant. Therefore, CDI scores explained 25.0% of the variance in STAI-T scores while they explained 16.0% of variance in M-OCSL scores.

Results of psychometric evaluations for the sample according to gender are presented in Table 4. Female children diagnosed with OCD in our sample reported significantly higher levels of depressive and obsessive-compulsive symptoms and trait anxiety. 95% Confidence



Intervals for CDI (0.7-4.2), STAI-T (1.7-5.3) and M-OCSL-Total (0.9-3.8) scores did not include 0.0 while others did. All three had moderate effect sizes (Cohen's  $d=0.31$ ,  $0.44$  and  $0.38$ ; respectively). For M-OCSL subscales, effect sizes varied between  $0.22$  (rumination and control) to  $0.30$  (doubt).

## DISCUSSION

This retrospective chart review study of a large clinical sample of Turkish children and adolescents with OCD revealed that males and females had similar ages at clinical application and that their duration of symptoms was also similar. Parental characteristics did not differ between genders apart from greater maternal self-reported psychopathology among female children with OCD. Males with OCD had later word onset and toilet training while females had significantly less breastfeeding histories. The most common obsession in this sample was contamination while the most common compulsion was ordering/checking. Cleaning and checking compulsions were more common among males while contamination and exactness obsessions were more common among females. Female children in our sample also report a greater number of obsessions and compulsions. Males had greater ADHD and tic disorder comorbidity while females had greater MDD comorbidity. It is known that the comorbidity of ADHD and OCD is associated with earlier onset, dominance of male sex, more severe psycho-social impact, and OCD related dysfunction and increases the probability of other psychiatric disorders (bipolar disorder, tic disorders, anxiety disorders etc) being added to the clinical picture (30, 31). In the present study also, ADHD and tic disorders were more common in males diagnosed with OCD, which is compatible with the literature. Additionally, having comorbid Major depressive disorder increases the tendency to chronic OCD and leads the treatment response to decrease and the prognosis to become more unfavorable (32). In the present study, it was found to cause common occurrence of MDD in girls, clinical picture being more complicated and occurrence of higher number of obsessions and compulsions. In conclusion, further retrospective and prospective studies evaluating the ages of onset and etiology of comorbid disorders can be useful in understanding how these disorders are related

each other with OCD. In psychometric measures female children report greater depressive and obsessive-compulsive symptoms along with elevated trait anxiety. All those differences had small to moderate effect sizes.

Pediatric OCD is known to have a slight male preponderance and previous studies on clinical samples of Turkish children with OCD report male: female ratios varying from  $0.9-1.9$  (3, 4, 11-14). This ratio was found to be  $1.3$  in our study in accordance with the literature. The reported age of onset for symptoms in pediatric OCD is known to be between  $7.5-12.5$  years (Mean= $10.3$ ) while the age of diagnosis is reported to be between  $12.0-15.2$  years (Mean= $13.2$ ) (3, 4). Not all the previous studies from our country reported age of onset although the reported age of patients at application varied between  $11.7$  and  $12.1$  years (4, 11-14). Similar to previous reports the mean age of patients in our sample was  $11.1$  years and the mean duration of symptoms predating diagnosis was almost 4 years with no difference between genders. Among our large clinical sample of pediatric OCD patients first ( $54.5\%$ ) or second ( $30.7\%$ ) born children predominated. This is similar to previous studies on clinical samples from our country, which reported rates of  $43.2-58.1\%$  for first-born children (4, 11-14). Although earlier reports suggested an effect of birth order with OCD with patients being predominantly the first-born, later studies provided inconclusive (33-35). Therefore, further studies on relationships between birth order and OCD are required.

Previous studies focusing on parental psychopathology among pediatric probands with OCD from Turkey are scarce. Vural and colleagues reported that the most common diagnoses among mothers were MDD ( $47.5\%$ ), GAD ( $12.5\%$ ) and OCD ( $5.0\%$ ) while for fathers the most common diagnoses were Alcohol Use Disorders ( $12.5\%$ ) and OCD ( $10.0\%$ ) (13). Diler and Avci reported that the three most common maternal diagnoses in their sample were OCD ( $12.0\%$ ), GAD ( $9.0\%$ ) and MDD ( $9.0\%$ ) while for fathers those were OCD ( $4.0\%$ ), GAD ( $4.0\%$ ) and Stuttering/ADHD ( $2.0\%$  for both, 5) (11). Taner and colleagues reported that the most common disorders among mothers were GAD ( $32.0\%$ ) and OCD ( $24.0\%$ ) while for fathers the most common diagnosis was tic disorders ( $20.0\%$ ) (36). Sahin et al. reported that  $26.7\%$  of parents of their sample had psychopathology and that

most common diagnoses were MDD (16.7%), adjustment disorders (11.7%) and OCD (6.7%) (37). However, they did not report paternal and maternal psychopathologies separately. Our results are broadly similar to those reports with the three most common maternal disorders being MDD, OCD and bipolar disorder. The corresponding paternal diagnoses were OCD, alcohol use disorders and MDD. Almost all the studies from Turkey (4, 11–14) except that of Taner et al. and Sahin et al. evaluated parental psychopathologies among pediatric patients with OCD via self-reports and our study is no exception (36, 37). Therefore, our results may be affected by reporting and recall bias and should be regarded with caution. The greater maternal self-reported psychopathology among female patients with OCD in our sample is a novel finding and should be replicated.

Pure obsessions in clinical samples of pediatric OCD from Turkey were reported from 8.8% to 29.0% while patients with both obsessions and compulsions formed 39.2% to 100.0% depending on the samples (4, 11–14). The most common obsessions in clinical samples were contamination (40.0%- 48.9%) (11, 13) while the most common compulsions differed among studies with some reporting control (22.5%) (13) and others reporting cleaning (68.1%) (11). In our sample, patients with pure obsessions formed 44.4% of the sample while 32.3% had compulsions, leaving only 23.3% with both obsessions and compulsions. Among our whole sample contamination/dirt obsessions (48.6%) were predominant while the most common compulsion was ordering/checking (34.3%). Cleaning and checking compulsions were more common among males while contamination and exactness obsessions were more common among females. Female children in our sample also report a greater number of obsessions and compulsions. Tunas and colleagues reported that obsessions of exactness (30.6%) and ordering/ checking compulsions (22.4%) were significantly more frequent among female children with OCD (14). The most common obsessions in pediatric OCD are known to be dirt/contamination and doubt while the most common compulsions are known to be cleaning/washing and checking and our results support those findings (3, 4).

Regarding gender differences, males are known to display an earlier onset, greater severity of OCD, more

sexual/ religious and aggressive symptoms while females are known to have more contamination/ cleaning symptoms, albeit with some conflicting reports (3, 4, 38). We have found no difference for age of onset between genders. The apparent contradiction in our results for gender differences may be due to biased sampling as well as recall and reporting bias. In our study, sexual and religious obsessions were reported in 3.9% and 5.9% of the samples, respectively, with no difference between genders. Previous studies on clinical samples of Turkish children with OCD reported rates of sexual and religious obsessions as 7.2-20.0%, and 6.4-13.0% respectively without comparing rates between genders (4, 11–14). The reported rates were significantly less in our study and there was no effect of gender. This may be due to sampling and reporting bias. The unique features of the Turkish society may have prevented male children in our sample from disclosing their sexual/ religious and aggressive symptoms and there may also be an effect of geographical location of study centers (39, 40).

It is known that up to 80.0% patients with pediatric OCD meet the criteria for another diagnosis (3, 4). As for comorbidity in clinical samples, the reported rates for Turkish studies vary from 34.4% to 71.2% (4, 11–14). Most common comorbid diagnoses in those studies were MDD (29.8%-47.5%) (11, 13), GAD (5.0%-9.0%) (11, 13, 14) and ADHD (4.3%-11.8%) (11, 14). According to those studies, ADHD is more frequent among males while MDD and GAD are more frequent among females (11, 14). In parallel to the previous studies, most of the patients in our sample (78.0%) had a comorbid diagnosis with 46.8% having one and 31.1% having 2 comorbidities. Most common comorbidities were ADHD, GAD, MDD, Tic Disorders, elimination disorders and intellectual disability/ mental retardation, in decreasing order of frequency. Male patients in our sample with OCD had significantly more common ADHD and tic disorder diagnoses. Female patients in our sample had significantly more common MDD comorbidity. There was also a signal that females may have more frequent comorbidity although this signal remained at trend level. Accordingly, our results in terms of comorbidity are consistent with the literature.

There was also an expected significant correlation between subjectively reported depressive and obsessive-



compulsive symptoms and trait anxiety among our sample which seemed to be partially related to increasing patient age. Because of the cross-sectional nature of the study temporal ordering of symptoms cannot be ascertained.

The delayed development of speech in male patients with OCD in our sample may be due to normative variation (i.e., male infants are known to speak later than females), may reflect the elevated burden of medical comorbidities (i.e., elevated rates of asthma etc. among male patients in our sample) or reflect elevated rates of comorbid neurodevelopmental disorders (e.g., ADHD, tic disorders etc.) (30, 31, 41). The cross-sectional nature of our study precludes hypotheses and further studies on the effects of gender on developmental milestones of children with OCD may be required.

Our results should be evaluated in terms of their limitations. The study was designed as a single center, retrospective chart review and may not be generalized to clinical samples from other centers. Rates for missing data were high although statistical methods suggested that the loss might be random. Sensitivity analyses were also done to reduce the effect of lost data on psychometric measures. Subjective reports of depressive and obsessive-compulsive symptoms may not correlate with objective clinical reports and our results may have been stronger if clinician-rated scales and parent/ teacher reports could be included in analyses. We depended on parental reports for their psychopathologies, development of their children and ages at onset of first symptoms in their offspring as well as stressors predating application for treatment and this may be affected by recall and reporting bias. Phenomenological information for obsessions/ compulsions of children were gathered with unstructured clinical interviews and a structured checklist such as Yale-Brown Children's Obsessive Compulsive Inventory may provide more adequate information (17).

On the other hand, this is the largest study on a clinical sample of pediatric OCD from Turkey that we are aware of in terms of sample size and time frame and statistical power. Post-hoc power analysis for a chi square test on our sample (n=440) at alpha 0.05 for detecting a small-moderate effect demonstrated that statistical power is more than adequate (i.e., 99.9%) supporting internal validity.

## CONCLUSIONS

Results of this retrospective chart review study of a large clinical sample of Turkish youth with OCD support the view that contamination obsessions and ordering/ checking compulsions as well as comorbid diagnoses are common. As expected, ADHD and tic disorders are more common among males while MDD is more common among females.

Female children in our sample report greater subjective distress and more obsessions/compulsions. Contrary to previous reports ages at clinical application and onset of symptoms are similar. Also, contrasting previous reports, cleaning and checking are more common among males. Mothers of female children with OCD report greater psychopathology.

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**Ethics committee approval:** This study was approved by the local clinical research ethics committee (Mersin University), and written informed consent was obtained from all the participants prior to the commencement of the study. The study was conducted in accordance with the Declaration of Helsinki.

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