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ARTICLE

The prevalence of childhood psychopathology in Turkey: a cross-sectional multicenter nationwide study (EPICPAT-T)

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ABSTRACT

Aim: The aim of this study was to determine the prevalence of childhood psychopathologies in Turkey.

Method: A nation-wide, randomly selected, representative population of 5830 children (6–13 years-old) enrolled as a 2nd,3rd or 4th grade student in 30 cities were evaluated for presence of a psychiatric or mental disorder by a Sociodemographic Form, Kiddie Schedule for Affective Disorders and Schizophrenia for School Age Children-Present and Lifetime Version (K-SADS-PL), and DSM-IV-Based Screening Scale for Disruptive Behavior Disorders in Children and Adolescents scales. Impairment criterion was assessed via a 3 point-Likert scale by the parent and the teacher independently.

Results: Overall prevalence of any psychopathology was 37.6% without impairment criterion, and 17.1% with impairment criterion. Attention-deficit hyperactivity disorder was the most frequent diagnosis, followed by anxiety (19.5% and 16.7% without impairment, 12.4% and 5.3% with impairment, respectively). Lower education level and presence of a physical or psychiatric problem of the parents were independent predictors of any psychopathology of the offspring.

Conclusion: This is the largest and most comprehensive epidemiological study to determine the prevalence of psychopathologies in children and adolescents in Turkey. Our results partly higher than, and partly comparable to previous national and international studies. It also contributes to the literature by determining the independent predictors of psychopathologies in this age group.

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Introduction

Recent epidemiological figures about the worldwide prevalence of childhood mental disorders indicate that approximately 13% of children and adolescents suffer from these diseases [1]. The behavioral or emotional disorders generally result with disrupted family life, academic failure, social isolation, and associated with significant morbidity. Determining the extent of these diseases is crucial for planning effective interventions, and resource allocation for relevant efforts. Numerous studies to evaluate the extent of childhood mental problems were conducted until today. Nevertheless, majority of currently available prevalence estimates come from high-income countries, which represent only 10% of the total childhood population in the world [2]. The studies from Asia reported that prevalence rates of the childhood psychiatric disorders in non-Western communities ranged between 6.33% [3] to 16.4% [4], but each study utilized varying scales and methodologies, and conducted in different age groups. Several other studies from Asia also reported similar results [5–10]. The studies from the Middle East reported that prevalence rates for any psychopathology were ranged between 11.7% [11] to 22.2% [12]. When the entire world population is considered, recent studies represent a global coverage rate of 6.7% for the current figures on the topic [13]. These concerns imply the need for national studies on non-represented populations following a state-of-the-art methodology, which will also contribute to the global prevalence estimates [1].

Some recent studies suggested that epidemiological studies about childhood mental disorders are prone to over-diagnosis and over-treatment in some extent [14,15]. Nevertheless, several methodological concerns should be considered on this issue, including being restricted to specific diseases and utilizing non-standardized assessment tools. According to us, the best evidence about the global prevalence was reported by Polanczyk et al., who declared that the main limitation for evaluating the global prevalence was the lack of data in various countries. Authors also suggested that future surveys should be conducted in areas with very restricted or no data on prevalence rates and should follow methodological strategies that guarantee comparability across studies [1]. But, this is an intrigue issue, because majority of the psychiatric epidemiological studies do not utilize standardized methodologies, which also results with non-comparability even in the same population. One can clearly postulate that childhood psychiatric problems are strictly associated with social and cultural factors in the populations, and obtaining methodologically flawless data from different cultures and populations will contribute to elucidate the etiological background of these disorders. From these aspects, nationally representative studies with high methodological quality are needed, including our country, Turkey.

Turkey is a transcontinental country with a culturally heterogeneous population. The western parts of the country are more developed with higher-income, and the eastern parts are less developed and with lower-income sociodemographic

populations. Also, there is a significant migration from East to West, and from rural to urban in Turkey. This also contributes to the heterogeneity in the population structure all over the country. As a consequence, obtaining a reliable prevalence about childhood mental problems becomes more difficult since these disorders are tightly related with cultural norms in a population. There is no available large-scale and cross-country epidemiological study about the prevalence of childhood mental disorders in Turkey. There have been several attempts to determine the frequency of childhood mental disorders, but they were either focused on one diagnosis or limited with a sample from a specific geographical region in the whole country, or mostly relied on self- and/or parent-reported outcomes [16–18]. Accordingly, the prevalence of clinically significant problems was reported to be between 9.3% and 10.9% for early childhood in Turkey. But, overall conclusion was that studies on nationally-representative samples from Turkey evaluating all of the potential psychopathologies among children and adolescents via structured interviews, and evaluating the relationship with impairment is limited [19]. As a consequence, the country did not contribute to estimates of the recent meta-analysis about the global prevalence of mental disorders in children and adolescents [1].

Based on this background, we have conducted a multicenter, cross-country, standardized, large-scale epidemiological study to determine the prevalence of mental disorders in children and adolescents in Turkey. This study, namely EPICPAT-T, is a nationally representative face-to-face survey of school age children in Turkey. In this report, our goals are: (1) to report 12-month prevalence rates of mental disorders; (2) to investigate the influence of impairment requirement on rates of disorders; (3) to describe rates of disorders, with and without impairment, across regions of the country. This is the first study of its kind in Turkey, which provides both a national prevalence, and also an international data that can be compared with other populations across the world.

Material and methods

Sample

The EPICPAT-T is a nationally representative face-to-face survey of 5830 children in Turkey. The survey was planned and conducted by the Turkish Association of Child and Adolescent Mental Health in collaboration with the Ministry of National Education. The sample frame was defined as all elementary (2nd,3rd or 4th grade) school-aged children across the country in 2014–2015 academic year, which corresponded to 5,434,150 children in 27,544 schools according to Ministry of Education, and Turkish Statistical Institute [20,21]. The sample size to predict a population prevalence of 0.15 at 95% confidence interval with an effect size of 0.01 (d) was calculated as 4898 subjects. Keeping the representativeness as the first criteria of the study, 30 participating centers including child and adolescent psychiatry specialists registered to the Turkish Association for Child and Adolescent Psychiatry, were determined across Turkey, and then Ministry of National Education randomly assigned schools to participate to the study in the rural area of these centers. Number of participants in each center was predetermined by weighing according to the population size of relevant county. After determining the schools and sample size, each study center coordinator randomly assigned participants to include. In case of non-response, a substitute enrollment list was also prepared, and with inclusion of substitute participants, the final database included 5830 children. Overall attrition rate was 5.93%, which then completed by substitutions.

Socio-demographic characteristics assessed included age (in years), sex, parent education, occupation, and physical and psychiatric disorders. Table 1 presents the sociodemographic characteristics of the sample. Minimum age for enrollment to primary school in Turkey is 66 months. In EPICPAT-T study, the majority of children ranged between 7 to 10 years-old (95.3%). The marginals of the age distribution was 6 years-old (0.9%) to 13 years-old (0.1%). Mean age of the students was 8.68 ± 0.02 years (range 6–13 years), with similar proportions from each grade (2nd grade: 33.4%, 3rd grade: 35.2%; 4th grade 30.9%). Boys represented 51.7% of the sample. Mean age of mothers was 35.27 ± 0.07 years, and 64.1% of them were between 30 and 39 years of age. Most of them were secondary-school graduates (41.7%), and 81.8% of them were housewives. Physical and psychiatric problems were reported by 14% and 10.6% of mothers, respectively. Mean age for fathers was 39.5 ± 0.08 years. One-third of them were graduated from primary school (34.8%), and 16.7% were graduated from university. Almost half of the fathers (40.9%) were unskilled/menial and one-third (34.4%) were semi-skilled workers. Physical and psychiatric problems were reported by 4.3%, and 11.5% of fathers, respectively.

Measures

Mental disorders were evaluated by the Kiddie Schedule for Affective Disorders and Schizophrenia for School Age Children- Present and Lifetime Version (K-SADS-PL). This is a semi-structured interview developed by Kaufman et al. [22] to evaluate present and lifetime psychopathology in children and adolescents according to DSM-III-R and DSM-IV criteria. The reliability and validity study of the Turkish translation was conducted by Gokler et al. [23].

The diagnoses of Attention-Deficit/Hyperactivity Disorder, Oppositional Disorder and Conduct Disorder were based on the DSM-IV-Based Screening Scale for Disruptive Behavior Disorders in Children and Adolescents, which employs the criteria for these disorders according to the DSM-IV. It includes 41 questions (9 each for inattention and hyperactivity/impulsivity, 8 for oppositionality and 15 for conduct problems). Each question is evaluated on a 4-point Likert-type scale (0 = None, 1 = Somewhat, 2 = High, 3 = Very High). The Turkish version was found to be reliable and valid previously [24].

Past 12-months prevalence rates for attention-deficit hyperactivity disorder, mood disorder (including major depressive disorder, dysthymia, adjustment disorder, and

Table 1. General characteristics of the participants.

Childrens' characteristics	
Age (years), *mean ± SEM*	8.68 ± 0.02
Gender, *n (%)*	
Girl	2813 (48.3)
Boy	3017 (51.7)
Grade, *n (%)*	
2nd grade	1943 (33.6)
3rd grade	2045 (35.3)
4th grade	1798 (31.1)
Mothers' characteristics	
Age (years), *mean ± SEM*	35.27 ± 0.07
Education, *n (%)*	
No education	430 (7.4)
Primary school	319 (5.5)
Secondary school	2433 (41.7)
High school	823 (14.1)
University	1812 (31.1)
Occupation, *n (%)*	
Housewife	4762 (81.8)
Working	1063 (18.2)
Physical illness, *n (%)*	
None	5010 (86)
Present	814 (14)
Psychiatric illness, *n (%)*	
None	5210 (89.4)
Present	620 (10.6)
Fathers' characteristics	
Age (years), *mean ± SEM*	39.5 ± 0.08
Education, *n (%)*	
No education	189 (3)
Primary school	2004 (34.8)
Secondary school	932 (16.2)
High school	1666 (29)
University	962 (16.7)
Work category, *n (%)*	
None	152 (2.7)
Unskilled/menial	2306 (40.9)
Semi-skilled	1942 (34.4)
Skilled/managerial	1117 (19.8)
Retired	127 (2.3)
Physical illness, *n (%)*	
None	5538 (95.8)
Present	243 (4.2)
Psychiatric illness, *n (%)*	
None	5116 (88.5)
Present	666 (11.5)

depression NOS), specific phobia, post-traumatic stress disorder, acute stress disorder, social anxiety, separation anxiety, generalized anxiety disorder, panic attack, anxiety NOS, pervasive development disorder, tic disorder, obsessive-compulsive disorder, enuresis nocturne, encopresis, specific learning disability, oppositional-defiant disorder, conduct disorder, mental retardation, selective mutism, and articulation disorder were determined.

Impairment was assessed via a 3 point-Likert type scale (0 = None, 1 = Mild, 2 = Moderate/Severe) independently by the parent and the teacher [19,25,26]. The parent evaluated peer and sibling relations, academic skills and general functioning in the home while the teacher evaluated domains included problems as a student, peer relations, achievement levels and self-esteem. We defined the presence of impairment as a rating of "very problematic" in at least one domain, or as a rating of "somewhat problematic" in at least two domains as per previous studies by either the parent or the teacher [19,25–27]. All prevalence data were presented for both cases without (w/o) and with impairment.

The members of the study team were all child and adolescent psychiatry specialists. They were trained by virtual online webinar meetings about the utilization of the scales used in the study, and about the accurate data collection procedures. Following the trainings, pilot assessments were conducted to assure the accuracy and reliability between interviewers. After the trainings, each interviewer has conducted the assessments for the selected children from her/his study area.

The sampled children were not contacted *per se* but evaluations were done via parent and teacher reports. The parent (mostly mother) was questioned on sociodemographic variables, the complaints of children were screened via K-SADS-PL semi-structured interview (covering Mood, Psychotic, Anxiety, Autistic Spectrum, Elimination, Eating, Tic and Disruptive Behavior Disorders as well as a remainder category –via unstructured interview- for Learning and Intellectual Disabilities via parental interview. Also, the parent and the teacher filled the DSM-IV-Based Screening Scale for Disruptive Behavior Disorders in Children and Adolescents.

The collected data was sent to the Turkish Association of Child and Adolescent Mental Health and collated by the authors of the study. Then, the data was entered into a database by a Contract Research Organization. The integrity of final database was evaluated further by analysts and authors of the study.

Ethical approval

The study protocol was evaluated and approved by the Institutional Review Board of Bakirkoy Prof. Dr. Mazhar Osman Training and Research Hospital for Nervous and Mental Disorders (Date: 04 November 2014, No: 427). All the participating study centers also sought and received approval from their respective institutions.

Statistical analyses

Descriptive data were presented as mean and standard error of mean for numerical variables, and frequency and percent for categorical variables. The 95% confidence intervals were presented along each descriptive data. Odds ratios were calculated to compare the distribution of the presence of mental disorders between geographical regions, and results were also presented in forest-plots. The effects of independent correlates on the presence of mental disorders were assessed in multivariate logistic regression models. Statistical significance was considered as 5% of Type-I error level across the study. All analyses were performed with SPSS 21 (IBM Inc., Armonk, NY, USA) software.

Results

The general characteristics of a total of 5830 children (boy/girl: 51.7/48.3%) and their parents were presented in Table 1. Table 2 presents the prevalence rate of individual mental disorders according to the presence of impairment and by sex. Overall prevalence of any mental disorder was 37.6% (95% CI

36.31–38.8). When impairment criteria were considered, the prevalence of any disorder was estimated in 17.1% (95% CI 16.17–18.11). The prevalence of any mental disorder in girls and boys was 33.8% (95% CI 32.07–35.57) and 41% (95% CI 39.29–42.81) w/o impairment, and 13.6% (95% CI 12.32–14.86) and 20.5% (95% CI 19.01–21.89) with impairment, respectively.

The most common mental disorder was ADHD, with an overall prevalence of 19.5% (95% CI 18.47–20.5) w/o impairment, and 12.4% (95% CI 11.55–13.24) with impairment. The prevalence of ADHD according to sex was 14.3% (95% CI 13.01–15.6) w/o impairment and 8.6% (95% CI 7.56–9.64) with impairment for girls, and 24.3% (95% CI 22.78–25.84) w/o impairment and 15.9% (95% CI 14.62–17.24) for boys.

The mood disorder group included major depression, dysthymia, adjustment disorder, and depression-*NOS*. Overall prevalence of any mood disorder w/o and with impairment were 2.5% (95% CI 2.09–2.9), and 1.5% (95% CI 1.23–1.87), respectively. The prevalence for mood disorders w/o and with impairment were 2.7% (95% CI 2.11–3.31) and 1.8% (95% CI 1.26–2.23) for girls, and 2.3% (95% CI 1.76–2.83) and 1.4% (95% CI 0.95–1.78) for boys, respectively. Highest prevalence rates were observed for major depression among all mood disorders.

Anxiety disorders included specific phobia, post-traumatic stress disorder, acute stress disorder, social anxiety, separation anxiety, generalized anxiety disorder, panic attack, and anxiety-*NOS*. Overall prevalence of any anxiety was 16.7% (95% CI 15.74–17.65) and 5.3% (95% CI 4.71–586) w/o and with impairment, respectively. These rates were 18.1% (95% CI 16.63–19.48) and 5.2% (95% CI 4.39–6.03) for girls, and 15.4% (95% CI 14.14–16.72) and 5.4% (95% CI 4.55–6.16) for boys, respectively.

The contributions of education levels and physical/psychiatric illnesses of the parents on childhood mental disorders were identified in multivariate logistic regression models. Accordingly, presence of any psychopathology, ADHD, and anxiety in the offspring were found to be associated with mother and father's education level and physical/psychiatric illness. The odds for presence of each of these disorders in children were varied with respect to risk factor, which were presented in the Table 3.

The distribution of mental disorders in children and adolescents had difference distribution patterns among geographical regions of Turkey (Figure 1). Accordingly, prevalence of any mental disorder without impairment ranged between 20.2% and 47.4% in Southeastern Anatolia and Black Sea regions, respectively. While, prevalence of any mental disorder with impairment ranged between 12.4% and 21.1%, lowest prevalence was in Southeastern Anatolia, and highest prevalence in Marmara region. Most common psychiatric disease was ADHD across the country. Highest prevalence of ADHD w/o and with impairment was in Mediterranean region and Marmara region, respectively. Table 4 presents a detailed comparison of odds ratios for presence of childhood mental disorders according to the geographical region. Figure 1 also compares the odds of any mental disorder between regions, and shows that Central Anatolia, Eastern Anatolia, and Southeastern Anatolia regions had a decreased risk of having a childhood mental disorder in contrary to Marmara, Black Sea, and Mediterranean regions. Aegean region also had a decreased risk, but this was not statistically significant. For the presence of any mental disorder with impairment, Aegean, Central Anatolia, and Southeastern Anatolia regions had a decreased risk, and Marmara region had an increased risk. To conclude, there

Table 2. Prevalence of mental disorders.

	Total				Gender			
					Girls		Boys	
	Without impairment		With impairment		Without impairment		Without impairment	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Any psychopathology	37.56	[36.31–38.8]	17.14	[16.17–18.11]	33.82	[32.07–35.57]	41.04	[39.28–42.8]
Attention-deficit hyperactivity disorder	19.48	[18.47–20.5]	12.39	[11.55–13.24]	14.31	[13.01–15.6]	24.31	[22.78–25.84]
Mood disorder	2.5	[2.09–2.9]	1.55	[1.23–1.87]	2.71	[2.11–3.31]	2.29	[1.76–2.83]
Any anxiety	16.7	[15.74–17.65]	5.28	[4.71–5.86]	18.05	[16.63–19.48]	15.43	[14.14–16.72]
Specific phobia	8.57	[7.85–9.29]	1.82	[1.48–2.17]	9.56	[8.47–10.65]	7.65	[6.7–8.6]
Post-traumatic stress disorder	0.41	[0.25–0.58]	0.12	[0.03–0.21]	0.61	[0.32–0.89]	0.23	[0.06–0.41]
Acute stress disorder	0.07	[0–0.14]	0.02	[0–0.05]	0.11	[0–0.23]	0.03	[0–0.10]
Social anxiety	3.1	[2.65–3.54]	1.55	[1.23–1.87]	3.25	[2.59–3.9]	2.96	[2.35–3.57]
Separation anxiety	4.03	[3.52–4.53]	1.6	[1.28–1.92]	4.07	[3.34–4.8]	3.99	[3.29–4.69]
Generalized anxiety disorder	2.38	[1.98–2.77]	0.96	[0.71–1.22]	2.6	[2.01–3.19]	2.16	[1.64–2.68]
Panic attack	0.05	[0–0.11]	0.03	[0–0.08]	0.04	[0–0.11]	0.07	[0–0.16]
Anxiety NOS	0.22	[0.1–0.35]	0.1	[0.02–0.19]	0.14	[0–0.28]	0.3	[0.1–0.49]
Pervasive development disorder	0.15	[0.05–0.26]	0.1	[0.02–0.19]	0.11	[0–0.23]	0.2	[0.04–0.36]
Tic disorder	2.32	[1.94–2.71]	0.83	[0.59–1.06]	1.5	[1.05–1.95]	3.09	[2.47–3.71]
Obsessive-compulsive disorder	1.48	[1.17–1.79]	0.4	[0.23–0.56]	1.36	[0.93–1.78]	1.6	[1.15–2.04]
Enuresis nocturne	8.33	[7.62–9.04]	2.03	[1.67–2.39]	6.53	[5.61–7.44]	10.01	[8.94–11.08]
Encopresis	0.72	[0.51–0.94]	0.28	[0.14–0.41]	0.39	[0.16–0.62]	1.03	[0.67–1.39]
Specific learning disability	0.5	[0.32–0.68]	0.31	[0.17–0.45]	0.32	[0.11–0.53]	0.67	[0.37–0.96]
Disruptive behavior disorder	3.8	[3.31–4.3]	2.5	[2.09–2.9]	2.64	[2.05–3.23]	4.89	[4.12–5.66]
Oppositional-defiant disorder	3.44	[2.97–3.91]	2.2	[1.83–2.58]	2.32	[1.76–2.88]	4.49	[3.75–5.23]
Conduct disorder	0.36	[0.21–0.52]	0.29	[0.15–0.43]	0.32	[0.11–0.53]	0.4	[0.17–0.62]
Mental retardation	0.74	[0.52–0.96]	0.52	[0.33–0.7]	0.61	[0.32–0.89]	0.86	[0.53–1.2]
Selective mutism	0.07	[0–0.14]	0.03	[0–0.08]	0.11	[0–0.23]	0.03	[0–0.10]
Articulation disorder	0.29	[0.15–0.43]	0.12	[0.03–0.21]	0.21	[0.04–0.39]	0.37	[0.15–0.58]

Table 3. Independent correlates of mental disorders.

	OR	95% CI for OR	*p*
Any mental disorder w/o impairment			
Mother's psychiatric illness	1.804	1.508–2.159	<0.001
Father's education (reference: illiterate)			<0.001
Primary school	1.762	1.232–2.519	0.002
Secondary school	2.152	1.484–3.12	<0.001
High school	1.662	1.158–2.385	0.006
University	1.293	0.89–1.88	0.178
Father's physical illness	2.837	2.14–3.762	<0.001
Father's psychiatric illness	1.305	1.094–1.557	0.003
Any mental disorder with impairment			
Mother's psychiatric illness	1.462	1.18–1.812	0.001
Father's education (reference: university)			<0.001
Illiterate	1.122	0.693–1.815	0.640
Primary school	1.407	1.077–1.838	0.012
Secondary school	1.668	1.247–2.229	0.001
High school	1.066	0.814–1.395	0.643
Father's physical illness	2.514	1.872–3.376	<0.001
Father's psychiatric illness	1.365	1.103–1.688	0.004
ADHD w/o impairment			
Father's education (reference: illiterate)			<0.001
Primary school	1.209	0.802–1.823	0.365
Secondary school	1.354	0.883–2.075	0.165
High school	1.083	0.714–1.642	0.708
University	0.764	0.493–1.185	0.229
Father's physical illness	2.070	1.544–2.774	<0.001
Father's psychiatric illness	1.263	1.027–1.553	0.027
ADHD with impairment			
Father's education (reference: university)			<0.001
Illiterate	1.423	0.854–2.369	0.176
Primary school	1.580	1.212–2.060	0.001
Secondary school	1.805	1.341–2.430	<0.001
High school	1.211	0.914–1.603	0.182
Father's physical illness	2.179	1.57–3.024	<0.001
Father's psychiatric illness	1.516	1.2–1.915	<0.001
Any anxiety w/o impairment			
Mother's education (reference: illiterate)			0.008
Primary school	1.473	0.921–2.356	0.106
Secondary school	1.898	1.314–2.742	0.001
High school	1.929	1.286–2.893	0.001
University	1.734	1.17–2.57	0.006
Mother's psychiatric illness	1.857	1.513–2.279	<0.001
Father's education (reference: illiterate)			<0.001
Primary school	2.077	1.135–3.8	0.018
Secondary school	2.344	1.258–4.367	0.007
High school	1.759	0.948–3.264	0.073
University	1.386	0.729–2.632	0.319
Father's physical illness	2.049	1.521–2.761	<0.001
Any anxiety with impairment			
Mother's education (reference: illiterate)			0.019
Primary school	1.222	0.563–2.653	0.612
Secondary school	2.195	1.228–3.925	0.008
High school	1,53	0.782–2.996	0.215
University	1.979	1.05–3.731	0.035
Mother's psychiatric illness	1.645	1.19–2.275	0.003
Father's education (reference: university)			<0.001
Illiterate	4.991	2.118–11.764	<0.001
Primary school	4.008	2311–6.950	<0.001
Secondary school	4.413	2512–7.755	<0.001
High school	2.102	1.207–3.661	<0.001
Father's physical illness	3.413	2.319–5.025	<0.001

was a significant geographical distribution pattern of childhood mental disorders in Turkey.

Discussion

This is the first nationally representative epidemiological study to estimate the prevalence of mental disorders in children in Turkey. Our results indicate that 37.6% of children affected by a mental disorder as defined by symptom level criteria, and 17.1% of children present symptom-level with impairment. The most frequent disorder was ADHD, followed by anxiety disorders, enuresis, and disruptive behavior disorders.

Our results are higher than some of the previous studies in Turkey [17,28], But, since the methodologies and measures used in each study are distinct, direct comparison of the prevalence is not appropriate. Nevertheless, there are some studies in the literature that utilized similar measurement scales with our study. One of those previous studies was conducted by Ercan et al. [19], and utilized K-SADS-PL and

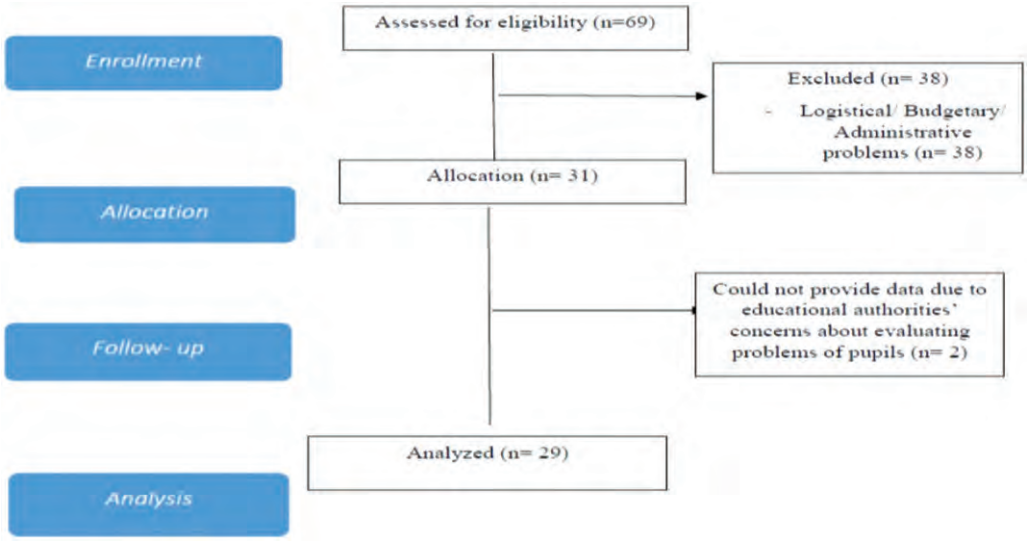

Figure 1. The flow chart of inclusion of centers in the Prevalence of Childhood Psychopathology in Turkey study (taken from the manuscript entitled as "TheEpidemiology of Childhood Psychopathology In Turkey" (Epicpat-T) Study: Rationale, Design and Protocol" with permission).

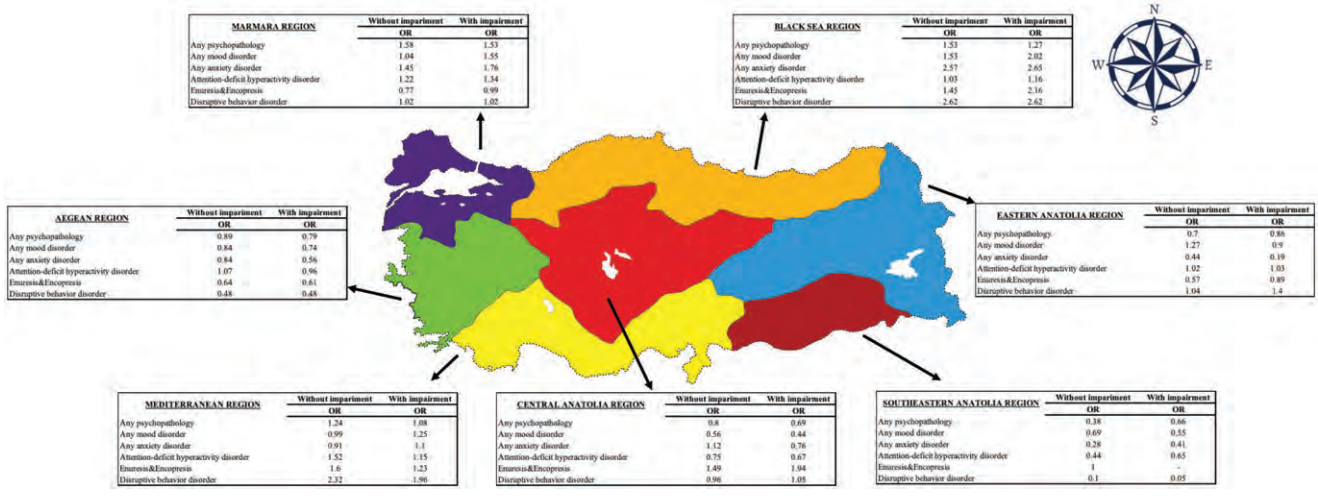

Figure 2. Distribution of the odds of psychopathologies according to geographical regions of Turkey.

impairment criteria, similar with our study. The authors reported that 36.7% of the sample met DSM- IV criteria when not considering impairment, and 25.6% and 14.1% of the cases had one or more DSM-IV disorders when a measure of moderate (parent OR teacher) and severe (parent AND teacher) impairment specific to each diagnosis was considered, respectively. These figures are comparable to our results.

As well as the national figures, the worldwide prevalence of psychopathologies were reported to be similar with our results. In a recent meta-analysis by Polanczyk *et al* [1], worldwide-pooled prevalence of mental disorders was reported as 13.4% (95% CI 11.3-15.9). Authors concluded on that their results were comparable to previous studies, which reported the median prevalence rates between 12% and 15%. Our results are in accordance with this study for overall psychopathology prevalence, but significantly different regarding ADHD prevalence. Polanczyk et al. [1] reported the worldwide prevalence of ADHD as 3.4% (95% CI 2.6–4.5). This is significantly lower than the previous meta-regression analysis report by the same author [29], and also lower than a more recent meta-analysis by Willcut [30], which reported the ADHD prevalence as 11.4% (95% CI 9.8–13.3) for 6–12 years old children. This latter study reported comparable prevalence estimates with our study.

We found in this study that there was a significant effect of geographical region on the prevalence estimates of psychopathologies. The highest prevalence was in the most industrialized and developed part of the country, whereas the lowest prevalence was in the least developed region of Turkey. Several factors may be encountered for this sharp difference. First, the socioeconomic development status may play a significant role on the behavioral patterns of children. Second, the variability and abundance of environmental stimulants and factors may negatively affect the normal development of children in developed cities. Third, there may be tendency in developed regions towards supposing normally increased activities of the child as abnormal behaviors, or vice versa, underrating pathological behaviors as just the naughtiness in regions with lower socioeconomic levels. And last, but not the least, the migration to developed parts

Table 4. Geographical differences for the risks of mental disorders.

	Without impairment			With impairment		
		95% CI for OR			95% CI for OR	
	OR	Lower	Upper	OR	Lower	Upper
Any psychopathology						
Aegean	0.89	0.764	1.037	0.79	0.641	0.968
Marmara	1.58	1.413	1.76	1.53	1.331	1.755
Black Sea	1.53	1.2	1.955	1.27	0.937	1.716
Mediterranean	1.24	1.052	1.467	1.08	0.873	1.337
Central Anatolia	0.80	0.689	0.927	0.69	0.56	0.844
Eastern Anatolia	0.70	0.557	0.887	0.86	0.638	1.158
Southeastern Anatolia	0.38	0.315	0.467	0.66	0.518	0.838
Any mood disorder						
Aegean	0.84	0.507	1.376	0.74	0.38	1.427
Marmara	1.40	1.007	1.957	1.55	1.022	2.357
Black Sea	1.53	0.794	2.938	2.02	0.965	4.211
Mediterranean	0.99	0.587	1.68	1.24	0.67	2.283
Central Anatolia	0.56	0.319	0.97	0.44	0.203	0.955
Eastern Anatolia	1.27	0.68	2.371	0.90	0.364	2.239
Southeastern Anatolia	0.69	0.38	1.253	0.55	0.238	1.256
Any anxiety disorder						
Aegean	0.84	0.68	1.025	0.56	0.372	0.831
Marmara	1.45	1.257	1.663	1.76	1.397	2.215
Black Sea	2.57	1.976	3.345	2.65	1.807	3.893
Mediterranean	0.91	0.723	1.135	1.10	0.775	1.572
Central Anatolia	1.12	0.929	1.342	0.76	0.536	1.066
Eastern Anatolia	0.44	0.303	0.649	0.19	0.072	0.523
Southeastern Anatolia	0.28	0.202	0.391	0.41	0.246	0.682
Attention-deficit hyperactivity disorder						
Aegean	1.07	0.889	1.279	0.96	0.768	1.202
Marmara	1.22	1.071	1.397	1.34	1.147	1.576
Black Sea	1.03	0.755	1.391	1.16	0.813	1.644
Mediterranean	1.52	1.258	1.838	1.15	0.906	1.46
Central Anatolia	0.75	0.623	0.91	0.67	0.524	0.845
Eastern Anatolia	1.02	0.776	1.331	1.03	0.744	1.42
Southeastern Anatolia	0.44	0.342	0.573	0.65	0.487	0.854
Enuresis&Encopresis						
Aegean	0.64	0.479	0.866	0.61	0.333	1.104
Marmara	0.77	0.635	0.938	0.99	0.686	1.423
Black Sea	1.45	0.997	2.114	2.16	1.175	3.959
Mediterranean	1.60	1.241	2.053	1.23	0.735	2.067
Central Anatolia	1.49	1.194	1.867	1.94	1.302	2.89
Eastern Anatolia	0.57	0.354	0.908	0.89	0.411	1.914
Southeastern Anatolia	1.00	0.753	1.328	–	–	–
Disruptive behavior disorder						
Aegean	0.48	0.293	0.796	0.48	0.258	0.889
Marmara	1.02	0.772	1.348	1.02	0.721	1.429
Black Sea	2.62	1.686	4.084	2.62	1.536	4.472
Mediterranean	2.32	1.667	3.23	1.96	1.286	2.982
Central Anatolia	0.96	0.659	1.387	1.05	0.671	1.63
Eastern Anatolia	1.04	0.599	1.808	1.40	0.768	2.553
Southeastern Anatolia	0.10	0.033	0.32	0.05	0.007	0.373

of the country may be significant factor that brings an additional adaptation burden on the children, which may also be accounted for the high prevalence of psychopathologies.

The significant correlates of the psychopathologies that determined by multivariate regression models were lower education level, higher age group, and presence of a physical or psychiatric problem of the parents. These predictors are novel findings for the literature on this topic.

The major strength of this study is its state-of-the-art methodology. It was designed to obtain prevalence figures that are comparable to the national large-scale studies from other countries. To achieve this aim, a large and representative sample was determined from the entire primary school children in the country. The study sample was also backed-up by a substitution list, and as a consequence, attritions have not affected the overall sample size. Moreover, administration of well-validated scales for determination of the mental disorders has increased the reliability and comparability of the outcomes.

This study has also some limitations. First, the participants were randomly selected from schools in urban areas for ease of access by study centers, and did not cover the schools in rural areas. Second, a household sampling could not be performed, which might affect the prevalence rate by not including non-school aged children, and the children who did not attend their schools due to several reasons including ADHD. Last, but not least, we used a screening scale to evaluate ADHD in our study, which might lead to

overestimation of the prevalence of this disorder. Likewise, gathering information from the parents as main informants might also lead to overestimation or underestimation of the disorders.

Conclusion

As a conclusion, our results are generally comparable to literature data. Nevertheless, this study provides additional dimensions, like independent predictors of psychopathologies, to the literature. Our current results will base a foundation for the future studies by both providing the most comprehensive epidemiological methodology, and also the most recent and real-life prevalence for each psychopathology domain.

Disclosure statement

No potential conflict of interest was reported by the authors.

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