

Prevalence of Childhood Affective disorders in Turkey: An epidemiological study

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ABSTRACT

Aim: To determine the prevalence of affective disorders in Turkey among a representative sample of Turkish population.

Methods: This study was conducted as a part of the “The Epidemiology of Childhood Psychopathology in Turkey” (EPICPAT-T) Study, which was designed by the Turkish Association of Child and Adolescent Mental Health. The inclusion criterion was being a student between the second and fourth grades in the schools assigned as study centers. The assessment tools used were the K-SADS-PL, and a sociodemographic form that was designed by the authors. Impairment was assessed via a 3 point-Likert type scale independently rated by a parent and a teacher.

Results: A total of 5842 participants were included in the analyses. The prevalence of affective disorders was 2.5 % without considering impairment and 1.6 % when impairment was taken into account. In our sample, the diagnosis of bipolar disorder was lacking, thus depressive disorders constituted all the cases. Among depressive disorders with impairment, major depressive disorder (MDD) (prevalence of 1.06%) was the most common, followed by dysthymia (prevalence of 0.2%), adjustment disorder with depressive features (prevalence of 0.17%), and depressive disorder-NOS (prevalence of 0.14%). There were no statistically significant gender differences for depression. Maternal psychopathology and paternal physical illness were predictors of affective disorders with pervasive impairment.

Conclusion: MDD was the most common depressive disorder among Turkish children in this nationwide epidemiological study. This highlights the severe nature of depression and the importance of early interventions. Populations with maternal psychopathology and paternal physical illness may be the most appropriate targets for interventions to prevent and treat depression in children and adolescents.

1. Introduction

The majority of the mental disorders have their age of onset in childhood or adolescence. Because of the fact that the early interventions delay or prevent onset (Catalano et al., 2012; Thapar et al., 2012) of many of the mental disorders, the number of studies on the prevalence of mental disorders in children in the general population has significantly increased over the last several years (Achenbach et al., 2012; Rescorla et al., 2012). Nevertheless, compared with the increasing number of youth in the general population, little is known about the prevalence of mental disorders among children and adolescents.

One of the latest epidemiologic studies of child psychopathology pointed out that almost 20% to 49% of children and adolescents suffer from some form of psychiatric disorders (Kieling et al., 2011). Among these, with a prevalence of 14%, affective disorders, especially depression, constitute the third most common mental health condition in children and adolescents (Merikangas et al., 2009).

In a meta-analytic study, data of 41 studies from 27 countries were evaluated, a meta-regression analysis was performed to estimate the effect of population, and the worldwide-pooled prevalence of any depressive disorder was found to be 2.6% (95% CI 1.7–3.9) (Polanczyk et al., 2015). In a meta-analytic study by Bronsard et al. (2016), where data from eight studies in the child welfare system, including 3104 subjects, were evaluated, the estimated prevalence of any depressive disorder ranged from 3% to 38%. Subsequent analyses revealed that the prevalence of major depressive disorder (MDD) estimates ranged from 1% to 23% (Bronsard et al., 2016). In a recent study from Cyprus, 439 school children from 15 public elementary schools were assessed, and it was found that 10.25% of school children reported clinical depressive symptoms (Sokratis et al., 2017). In another study, the prevalence of depressive disorder in school-age children was reported to be 3.13%, with 0.81% MDD, 1.51% dysthymia and 0.81% depressive disorder not otherwise specified (NOS) (Sarkar et al., 2012). On the other hand, prevalence studies of mood disorders have been limited in Turkey. Toros et al. (2004) reported the prevalence rate of depression to be 12.5% in an adolescent school population. The prevalence of depressive disorder in children and adolescents was 4.2% in urban population sample (Demir et al., 2011). In the same study, the prevalence rates of dysthymic disorder

and depressive disorder NOS were 1.75% and 0.60%, respectively. Another study including 417 children 6–14 years of age revealed that the prevalence of MDD, was 2.9% without considering impairment and was 1.4% if impairment was considered (Bilac et al., 2014). In addition, when impairment was taken into account, the prevalence of mood disorders was 2.6% in girls and 0.4% in boys. However, a large body of evidence indicates that underdiagnoses and undertreatment are major public health problems for depression in child populations all around the world (Merikangas et al., 2013; Morris et al., 2011).

There are several risk factors for affective disorders, such as low socioeconomic status and the presence of psychiatric disorders (including depression) among parents. About 40% of the depressed children have a family history of psychiatric disorders (Beardslee et al., 1993). Also, age has been identified as an essential correlate of affective disorders (Grey et al., 2002; Kryspin-Exner and Felnhofer, 2012). Many studies have shown that prevalence rates of depressive disorders were higher in adolescents than in preadolescents. A large-scale European epidemiological study assessing approximately 12,000 adolescents from 11 countries estimated the prevalence of depression was 10.5%, and subthreshold depression 29.2% (Balazs et al., 2013). On the other hand, one-year prevalence of MDD in pre-pubertal-age children was reported to be between 1.4% and 3.4% (e.g. Merikangas et al., 2009; Vicente et al., 2012). Gender has also been identified as another correlate of affective disorders. Depressive disorder was more prevalent among adolescent girls than boys (e.g. Grey et al., 2002; Kryspin-Exner and Felnhofer, 2012; Toros et al., 2004).

Comorbidity in child populations is one of the factors that have an impact on chronicity and concomitant economic costs to society. Commonly reported comorbid conditions were anxiety disorders, conduct/oppositional defiant disorders and attention deficit hyperactivity disorder (ADHD) in children with MDD, anxiety disorders being the most common comorbidity (Harpoled et al., 2005). Studies also indicated higher comorbid rates with ADHD (Turgay and Ansari, 2006).

A basic principle of epidemiology is that the treatment and prevention depend on etiological factors. For example, depression is the second leading cause of disability worldwide, but little is known about its etiology (Mathers and Loncar, 2006). With its high rates of chronicity and concomitant economic costs to society, depression ranges among the most prevalent mental disorders. Also, children and adolescents with MDD are at greater risk for suicide and are more likely to

initiate alcohol and other drug use than children and adolescents without MDD (Nock et al., 2013; SAMHSA, 2014), and the majority of children and adolescents with MDD do not have diagnoses or receive depression care (Cummings et al., 2014). In addition, it is known that several trials have succeeded in demonstrating the beneficial effects of early depression prevention programs for otherwise healthy children and adolescents (Cummings et al., 2014; Kieling et al., 2011; Mathers and Loncar, 2006; Polanczyk et al., 2015). On this point, childhood seems to be a window of opportunity for prevention of mental, emotional, and behavioural disorders. Effective mental health strategies for the prevention and detection of depression depend on an initially accurate estimate of affective disorders in the target population.

Multi-center epidemiological studies are very important for determination of the prevalence, epidemiological factors and effective mental health strategies for the prevention and detection of affective disorders in children. There were no multi-center epidemiological studies assessing these epidemiological parameters in pre-pubertal children. Pre-pubertal period is a critical developmental period of which, many of the affective disorders have their onset, if we can detect at the initial phase of the affective disorder, we can treat it more effectively.

The aim of this study is to define the epidemiological correlates of affective disorders as a part of the “The Epidemiology of Childhood Psychopathology in Turkey” (EPICPAT-T). When combined with the results of recent national and international epidemiological studies of affective disorders in children (e.g., Achenbach et al., 2012; Demir et al., 2011; Rescorla et al., 2012), these data will provide a valuable empirical basis for the development of health policies.

2. Methods

This study is a part of the “The Epidemiology of Childhood Psychopathology in Turkey” (EPICPAT-T) Study. The study was planned by the Turkish Association of Child and Adolescent Mental Health to evaluate the prevalence of psychopathology among primary school students in Turkey for the 2014–2015 academic year. The data of the study was obtained by the authors in 31 study centers from 7 geographical regions. Every center had a coordinator (See “The Epidemiology of Childhood Psychopathology in Turkey” (EPICPAT-T) Study: Rationale, Design and Protocol” for detailed methodology). The flow chart of inclusion of centers in EPICPAT-T is shown in Fig. 1.

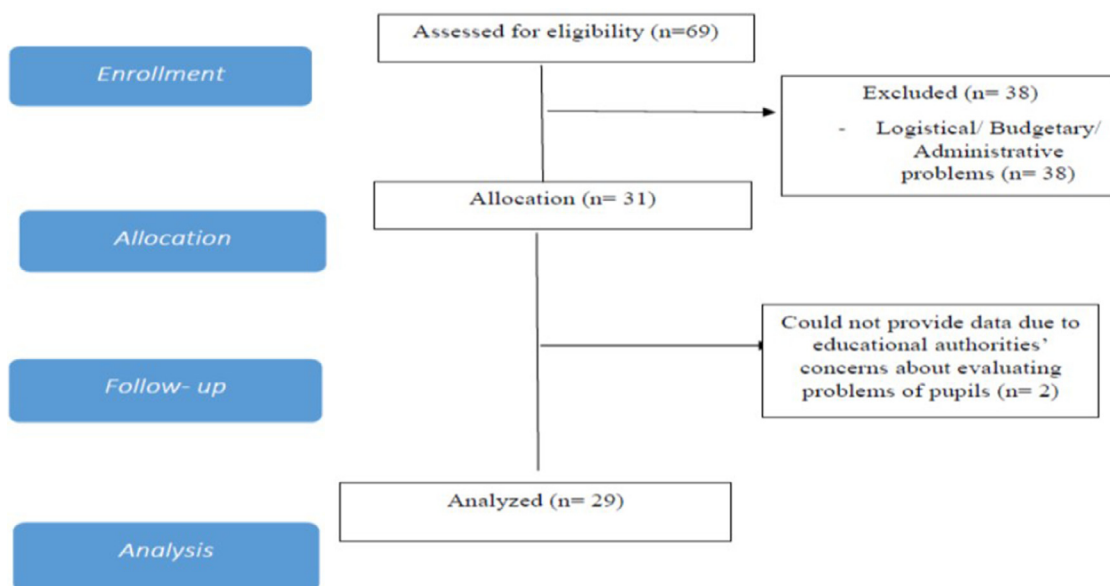


Fig. 1. The flow chart of inclusion of centers in the Epidemiology of Childhood Psychopathology in Turkey study (taken from the manuscript entitled as “The Epidemiology of Childhood Psychopathology In Turkey” (Epicpat-T) Study: Rationale, Design and Protocol” with permission).

2.1. Participants

The study coordinators contacted the Ministry of National Education to randomly assign schools in urban neighbourhoods served by the study centers for study participation. This assignment was weighted to reflect differing population sizes. The participants of the study were selected randomly from students between the second and fourth grades of the assigned schools to fulfil their quotas (Haahr, 2014–2015) in each study center. The quotas were weighted to reflect the number of residents in each county (according to number of County Representatives Selected to the National Assembly in the 2014 legal year, Legal Gazette, 2014) and the sampling quotas were calculated as number of representatives multiplied by 15. This led to a target sample of 5415 children among 12,107 classmates. The final database included 5842 children.

The only inclusion criterion was being a student between the second and fourth grades in the schools assigned as study centers. Prior to participation, the schools were contacted for student lists according to classes and the students were randomly selected from the prepared lists (Haahr, 2014–2015). In case the student randomized could not be contacted, the next randomly assigned student was enrolled. The parents (mostly the mothers) were informed of the study by class teachers as well as the study teams and those providing written informed consent were included in the study. No parents declined to participate.

3. Data collection tools

1. Sociodemographic Form

The sociodemographic form was developed by the study coordinators and included questions on parental education and vocation, physical/mental illnesses in the family, and identifying information on sampled offspring.

2. 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 and colleagues (1997) 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 Gökler and colleagues (2004). In this reliability and validity study, inter-rater reliability was reported as “very good” for externalizing disorders and tic disorders, “good” for ADHD and anxiety disorders (with a minimum reliability score of $\kappa = 0.625$), and the test-re-test reliability was reported as “very good” (with a minimum reliability score of $\kappa = 0.783$). The affective disorders supplement of the K-SADS-PL includes MDD, melancholic depression, atypical depression, MDD with psychotic features, schizoaffective disorder–depressed type (SA-D), dysthymia, depressive disorder NOS, adjustment disorder with depressed mood, manic bipolar disorder, depressed bipolar disorder, mixed bipolar disorder, rapid cycling bipolar disorder, hypomania, cyclothymia, bipolar disorder (BP) not otherwise specified (NOS) (BP-NOS), and schizoaffective disorder–manic type.

3. Impairment

Impairment was assessed via a 3-point Likert-type scale (0 = None, 1 = Mild, 2 = Moderate/ Severe) independently rated by a parent and a teacher (Bilac et al., 2014; Ercan et al., 2016, 2015). Parents evaluated peer and sibling relations, academic skills, and general functioning of their child while the teacher evaluated domains including problems as a student, peer relations, achievement levels, and self-esteem. We described “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 (Bilac et al., 2014; Brotman et al., 2006; Ercan et al., 2016, 2015).

4. Determination of socio-economic status

The socio-economical levels of subjects were calculated with addition of index points for vocational and educational status of family members older than 18 years of age and living in the same household with the child. As per the Turkish Family Structure Study conducted by the Ministry of Family and Social Policies (Family and Social Services General Directorate of the Ministry of Family and Social Policies, 2014), index points of 14–22, 8–13, and 2–7 were accepted to denote “high,” “medium,” and “low” socio-economic status, respectively.

4. Statistical analyses

The data were entered into a database prepared with SPSS for Windows™ version 22.0 (IBM Inc.). Sociodemographic variables were entered along with dummy variables for diagnoses according to K-SADS-PL. Impairments and DSM-IV-Based Screening Scale for Disruptive Behavior Disorders in Children and Adolescents scores were entered as Likert scales. Unconditional ICC (intra-cluster correlation) showed that county-level variables explained 3.5% of the variance for any psychopathology with impairment while region level variables explained 3.4% of the variance (Bickel, 2007). Therefore, both an aggregated (assuming independence) and a disaggregated (assuming clustering, multi-level analysis) analysis were conducted to evaluate the rates of psychopathology and effects of impairment across study centers and regions. We used descriptive statistics to summarize data. Bivariate analyses were conducted with Chi-Square tests and effect sizes were reported. Multi-level Poisson regression procedures were used to evaluate predictors of affective disorders. P was set at 0.05 and all of the comparisons were two-tailed.

5. Results

a) Descriptive features of the cases with affective disorders:

In the present study, the final sample included 5842 children (51.7% male). The mean ages of children, mothers, and fathers were 8.7 (S.D. = 1.2), 35.3 (S.D. = 5.5), and 39.3 (S.D. = 6.5) years,

respectively. Mean ages of children and their mothers and fathers with mood disorders with impairment were 8.9 (S.D. = 1.2), 34.3 (S.D. = 6.0), and 38.8 (S.D. = 5.8) years, respectively. The corresponding ages for those without mood disorders were 8.7 (S.D. = 1.2), 35.3 (S.D. = 5.5), and 39.5 (S.D. = 6.0) years, respectively. The mean ages of children with impairing mood disorders, their mothers and fathers did not differ significantly (t-tests; $p = 0.06, 0.10, \text{ and } 0.26$, respectively).

Maternal psychiatric disorders were significantly associated with affective (i.e., depressive spectrum) disorders (Chi Square = 92.6, $p = 0.000$, $\Phi = 0.13$) in the offspring. Paternal vocational status was significantly associated with affective (i.e., depressive spectrum) disorders (Chi Square = 38.1, $p = 0.001$, $\Phi = 0.08$) and affective disorders were significantly more common among offspring of fathers with unskilled/semi-skilled vocations. Paternal physical disorders were significantly associated with affective disorders (Chi Square = 24.1, $p = 0.002$, $\Phi = 0.07$) and affective disorders were significantly more common among offspring of fathers with chronic physical disorders. Maternal vocational status (Chi Square = 4.1, $p = 0.85$), maternal physical disorders (Chi Square = 7.2, $p = 0.13$), and paternal psychopathology (Chi Square = 4.5, $p = 0.34$) were not significantly associated with affective disorders in our study.

When impairment was taken into consideration maternal psychopathology was significantly associated with affective (i.e. depressive spectrum) disorders (Chi Square = 65.3, $p = 0.000$, $\Phi = 0.11$). With the impairment criterion in place, paternal vocational status was significantly associated with affective disorders (Chi Square = 11.7, $p = 0.02$, $\Phi = 0.05$). With the impairment criterion in place, paternal physical status was significantly associated with affective disorders (Chi Square = 24.8, $p = 0.000$, $\Phi = 0.07$). When impairment was taken into consideration neither maternal vocational status (Chi Square = 0.47, $p = 0.79$) nor maternal physical disorders (Chi Square = 0.91, $p = 0.34$) and paternal psychiatric status (Chi Square = 0.08, $p = 0.77$) were significantly associated with affective disorders in the offspring. The questions that were asked in the sociodemographic form are shown in Table 1.

a) Prevalence of the affective disorders

According to parent-reported syndromes without considering impairment in the aggregated sample of the EPICPAT-T in Turkey, the prevalence of the affective disorders was 2.5% ($n = 147$); 71 of the male students (2.3%) and 76 of the female students (2.7%) had one of the K-SADS-PL affective disorders diagnoses. The prevalence of affective disorders diagnoses according to K-SADS-PL are shown in Table 2.

a) The affective disorders and gender

Table 1
Sociodemographic form.

1. General information:	City of residence
	Date of birth
	Age
	Class
	School
2. Information about Parents:	Parents' being married or not
	Maternal age
	Maternal education
	Maternal job
	Paternal age
	Paternal education
	Paternal job
Maternal psychiatric disorder	
Maternal physical illness	
Paternal psychiatric disorder	
Paternal physical illness	

Table 2
Prevalence of the affective disorders.

	Male % (n)	Female % (n)	Total % (n)	P (X ²)
Any affective disorder				
Without impairment criteria	2.3 (71)	2.7 (76)	2.5 (147)	0.91
With impairment criteria	1.4 (42)	1.7 (49)	1.6 (92)	0.91
Major depressive disorder				
Without impairment criteria	1.6 (48)	1.9 (53)	1.7 (101)	0.91
With impairment criteria	1.0 (29)	1.2 (33)	1.06 (62)	0.91
Dysthymia				
Without impairment criteria	0.1 (7)	0.1 (7)	0.2 (14)	0.91
With impairment criteria	0.1 (5)	0.1 (7)	0.2 (12)	0.91
Adjustment disorder with depressive features				
Without impairment criteria	0.2 (12)	0.2 (11)	0.4 (23)	0.91
With impairment criteria	0.1 (5)	0.1 (5)	0.17 (10)	0.91
Depressive disorder NOS				
Without impairment criteria	0.1 (4)	0.1 (5)	0.15 (9)	0.91
With impairment criteria	0.1 (4)	0.2 (4)	0.14 (8)	0.91

NOS: not otherwise specified.

Due to excessively small cell sizes, comparisons for gender were conducted at the level of regions. No statistically significant differences between genders could be found at the level of regions when considering mood disorders (i.e., depressive spectrum disorders) with and without impairment. Tables 3 and 4 show the distribution of the affective disorders in terms of gender according to region, with and without impairment.

5.1. Predictors of affective disorders with pervasive impairment

To evaluate predictors of mood disorders with pervasive impairment, Type III model Poisson regression with log-link function was used. Omnibus test of the whole model was significant (Chi Square = 56.8, dF = 25, p = 0.000). Goodness of Fit statistics were 903.6 for AIC and 1075.9 for BIC. Maternal psychopathology (p = 0.000), paternal physical illness (p = 0.000) displayed significant effects in the whole model while geographical regions and remaining sociodemographic variables were not significant (however, children from Eastern Marmara region tended to be diagnosed less with mood disorders, B = 0.9, 95 % CI = 0.0–1.9, p = 0.06).

5.2. Comorbidity rates in affective disorders

Comorbidity was found in 57 patients with affective disorder diagnosis (i.e., 62.0 %). Most common comorbid diagnoses were ADHD (37.0%, n = 34), specific phobia (10.9%, n = 10), social anxiety

Table 3
Affective disorders (i.e., depressive spectrum disorders) according to gender and without considering impairment in the EPIC-PAT-T Study.

Region	MDD		Dys		DD- NOS		Adj. D.			P*
	n (%)		n (%)		n (%)		n (%)			
	M	F	M	F	M	F	M	F	F	
Istanbul	14 (2.0)	10 (1.5)	2 (0.3)	2 (0.3)	0 (0.0)	0 (0.0)	2 (0.3)	0 (0.0)	0 (0.0)	0.48
W. Marmara	1 (1.0)	4 (4.9)	0 (0.0)	0 (0.0)	2 (2.0)	0 (0.0)	1 (1.0)	0 (0.0)	0 (0.0)	0.18
Aegean	10 (2.5)	8 (1.8)	1 (0.2)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.2)	0 (0.0)	0 (0.0)	0.45
E. Marmara	6 (1.7)	7 (2.2)	2 (0.6)	2 (0.6)	0 (0.0)	3 (0.9)	5 (1.4)	3 (0.9)	3 (0.9)	0.43
W. Anatolia	4 (1.1)	4 (1.2)	0 (0.0)	1 (0.3)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.3)	1 (0.3)	0.52
Mediterranean	2 (0.6)	5 (1.6)	0 (0.0)	0 (0.0)	2 (0.6)	2 (0.6)	0 (0.0)	5 (1.6)	0 (0.0)	0.09
C. Anatolia	0 (0.0)	2 (2.9)	0 (0.0)	1 (1.4)	0 (0.0)	0 (0.0)	1 (1.5)	0 (0.0)	0 (0.0)	0.26
W. Black Sea	1 (1.3)	1 (1.8)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1.00
E. Black Sea	3 (6.8)	2 (4.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0.67
NE Anatolia	1 (1.8)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.8)	0 (0.0)	0 (0.0)	0.44
CE Anatolia	3 (2.3)	5 (3.5)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.7)	1 (0.7)	0.53
SE Anatolia	3 (0.8)	5 (1.8)	2 (0.5)	1 (0.4)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.4)	1 (0.4)	0.42

*Chi square test; MDD: major depressive disorder; Dys: dysthymia; DD-NOS: depressive disorder–not otherwise specified; Adj D: adjustment disorder; M: male; F: female; W: Western, E: Eastern, C: Central, NE: North Eastern, CE: Central Eastern, SE: South Eastern.

Table 4
Affective disorders (i.e., depressive spectrum disorders) according to gender and with considering impairment in the EPIC-PAT-T study.

Region	Female (%)	Male (%)	P*
Istanbul	1.5	1.8	NS
W. Marmara	2.4	3.1	NS
Aegean	0.9	2.0	NS
E. Marmara	2.8	2.3	NS
W. Anatolia	0.9	0.3	NS
Mediterranean	2.8	0.9	NS
C. Anatolia	4.3	0.0	NS
W. Black Sea	1.8	1.3	NS
E. Black Sea	2.2	4.5	NS
NE Anatolia	–	–	–
CE Anatolia	2.1	1.5	NS
SE Anatolia	1.4	0.5	NS

*Chi square test; W: Western, E: Eastern, C: Central, NE: North Eastern, CE: Central Eastern, SE: South Eastern.

Table 5
Predictors of mood disorders with pervasive impairment.

Predictor	B	95% CI (Wald)*	P
Maternal psychopathology (yes)	1.1	0.3–1.6	0.000
Paternal physical illness (yes)	1.1	0.3–1.7	0.000

Wald Chi Square; CI: confidence interval.

disorder (4.3%, n = 4), separation anxiety (12.0%, n = 11), generalized anxiety disorder (GAD) (9.8%, n = 9), panic attacks (1.1%, n = 1), pervasive developmental disorder (PDD) (2.2%, n = 2), tic disorders (7.6%, n = 7), enuresis (13.0%, n = 12), encopresis (3.3%, n = 3), oppositional defiant disorder (ODD) (18.5%, n = 17), conduct disorder (CD) (1.1%, n = 1), mental retardation (MR) (1.1%, n = 1), articulation disorder (1.1%, n = 1). There were no significant differences in comorbidity between genders (Chi Square = 2.1, p = 0.15).

6. Discussion

The present study is the first multi-center epidemiological study using a semi-structured interview for the diagnosis of affective disorders in children in Turkey. This study is a part of the “The Epidemiology of Childhood Psychopathology in Turkey” (EPICPAT-T) Study. We found out that the prevalence of any affective disorder was 2.5% without considering impairment and 1.6% when impairment was considered. In our sample, the diagnosis of BP was lacking, thus

depressive disorders constituted all the affective disorder cases. We found out that 2.7% of the female students and 2.3% of the male students were diagnosed with some form of affective disorders according to parent reports. When impairment was taken into consideration, the corresponding rates for females and males were 1.7% and 1.4%; respectively with no significant difference between genders. Mean age of children with mood disorders with impairment was 8.9 (± 1.2), years, which did not differ significantly from those without affective disorders (8.7 years (± 1.2)).

We found out that the prevalence of any depressive disorder was 2.5% without considering impairment and 1.6% when impairment was taken into account. The previous studies from Turkey had reported both lower (1.4%) (Bilac et al., 2014), and higher (4.2–12.55%) (Demir et al., 2011; Toros et al., 2004) prevalence rates for depressive disorders in children and adolescents. In a meta-analysis of the 41 studies from 27 countries, worldwide prevalence of any depressive disorder in children and adolescents was reported to be 2.6% (95% CI 1.7–3.9) (Polanczyk et al., 2015). In this meta-analysis, Polanczyk et al. had concluded that the sample representativeness, sample frame, diagnostic interview, and definition of functional impairment were associated with significant variability (Polanczyk et al., 2015). Our results were consistent with those of Polanczyk et al., who revealed that estimates with no requirement of impairment were higher than estimates with requirement of impairment (Polanczyk et al., 2015).

Among depressive disorders with impairment, MDD with a prevalence of 1.06% was the most common, followed by dysthymia with a prevalence of 0.2%, adjustment disorder with depressive features, with a prevalence of 0.17%, and depressive disorder NOS, with a prevalence of 0.14%. We found out that the prevalence of MDD was 1.7% without considering impairment and 1.06% when impairment was considered in our sample. Previous studies have reported both higher rates, ranging from 2.4% (Yang et al., 2004) to 9% (Doi et al., 2001) and lower rates as ranging from 0.3% (Lavigne et al., 1996) to 1% (Pine et al., 1999) for the prevalence of MDD. The worldwide prevalence of MDD in children and adolescents was reported to be 1.3% (95% CI 0.7–2.3) in the meta-analysis of Polanczyk et al., (2015) and our study reports the prevalence rates of MDD (with and without impairment) within the same confidence interval. These differences in prevalence estimates are likely attributable to the characteristics of the samples and the differences in research methods. Age is one of the important variables having impact on the prevalence estimates. Elevated risk for the depressive disorder was reported to begin in the early teens and continue to rise in a linear fashion throughout adolescence (Cairns et al., 2014). In line with this finding, the children included in the studies that reported higher prevalence rates (Doi et al., 2001; Yang et al., 2004) were typically older than our sample. The studies with lower rates, on the other hand, included both younger children (Lavigne et al., 1996) and older children (Pine et al., 1999), showing the impact of other factors on prevalence estimates.

The prevalence of dysthymic disorder (0.2%) was lower than in most of the studies reporting prevalence estimates between 0.6% and 4.6% for dysthymic disorder in children (Nobile et al., 2003). This inconsistency may be due to lower mean age of children with depressive disorders with impairment 8.9 (S.D. = 1.2) in our sample; as the mean age of onset of dysthymic disorder was reported to range between 10.1 \pm 4.9 and 13.8 \pm 3.1 years (Klein et al., 2000; Lewinsohn et al., 1991).

There were no statistically significant gender differences for depression in our sample which consisted of pre-adolescent children. This finding is consistent with the fact that gender difference in depression does not appear until adolescence (Angold and Costello, 2006). The findings of the Type III model Poisson regression revealed that maternal psychopathology and paternal physical illness were predictors of affective disorders with pervasive impairment. This result was consistent with many of the previous studies that have reported a relation between maternal psychopathology, and depressive disorder in the children

(Kennard et al., 2008; Kessler et al., 2003). On the other hand, the association between paternal physical illness and depression in the offspring was reported by some studies (Barkmann et al., 2007), while, some others failed to reveal such an association (Agerup et al., 2015). Maternal psychopathology may be related to depressive disorder in the children by interfering with the quality of parenting (Agerup et al., 2015). Although previous studies have focused on mostly the role of the mothers on childhood depression, both mothers and fathers have critical roles in the emotional regulation of children (Sanders et al., 2015). Paternal physical illness may be related to depressive symptoms in children by hampering this critical role.

The results of previous studies in children and adolescents indicated a prevalence of BP ranging from 0% to 2.1% (Merikangas et al., 2009). This discrepancy seemed partially to depend on the age of the screened population. For example, the Great Smoky Mountains Study did not identify any cases of BP in a community sample of 4500 school-age children (Costello et al., 1996), whereas among adolescents in a community sample the lifetime prevalence of BP (primarily BP II and cyclothymia), was reported to be approximately 1% (Lewinsohn et al., 1995). Consistent with these findings, there were no cases of BP disorder in our study sample, in which school-age children with a mean age of 8.7 \pm 1.2 years were included.

Different assessment instruments may also contribute to differences in prevalence. In the present study, a diagnostic semi-structured interview (-K-SADS-) was used; however, in another study from Turkey, where Young Mania Rating Scale was used to screen 2468 school age children (7–12 years of age), prevalence of BP was found to be 1.1% (Diler et al., 2008). Due to ongoing debate on the phenomenology of BP in youth, studies may use diagnostic criteria for either narrow or broad phenotype BP, which may have an impact on prevalence rates. For example, when sub-syndromal cases were included, lifetime prevalence of BP was found to be as high as 5%. (Sala et al., 2009).

Among all challenges that clinicians face with while screening BP in youth, difficulties of differential diagnosis due to developmental constraints (Singh 2008; Weckerly 2002; Weller et al., 2003), symptom overlaps (Carlson, 1998; Sanchez et al., 1999), and variability in symptom expression (Findling et al., 2003) constitute the main drawbacks. Clinical presentation of BP in children showed significant differences when compared with adults (Geller et al., 1997). The discrepancy becomes more prominent, especially in children younger than 10 years of age. Many of the common symptoms of BP in youth, such as increased energy, distractibility, and pressured speech overlap with symptoms of ADHD (Geller et al., 1998; Klein et al., 1998). Comorbidity, especially with ADHD, further complicates the accurate diagnosis (Emiroglu and Diler, 2009). On the other hand, besides BP, irritability can be a part of many psychiatric disorders, such as MDD, ADHD, ODD, CD (Birmaher et al., 1996; Spencer et al., 2001). The prevalence of ADHD in the EPICPAT-T Study was found to be 12.4%, which was somewhat higher than previous studies. Due to possible overlapping symptoms, some of the cases with BP might have been misdiagnosed as ADHD. Additionally, more than one-third of children with mood disorder, namely depressive disorders, had co-morbid ADHD diagnosis, in our sample. Co-occurrence of depression and externalizing symptoms have been regarded as a risk factor for developing BP, especially if there is a positive family history (Carlson and Weintraub, 1993). Our findings, therefore, could be suggestive of a possibility that a subgroup of the children with depressive disorder and ADHD comorbidity may have an underlying risk of developing BP during adolescence.

The main impact of this study is that; maternal psychopathology and paternal physical illness; which are strongly associated with childhood depression, should be the points of intervention, both for prevention measures and treatment modalities. Also, the data can be shared to the public for the purpose of psychoeducation. Meanwhile, this cohort can also be severing as the base to build up a brain imaging cohort such as Chinese Color Nest cohort in China (Yang et al., 2017).

7. Limitations

Our findings should be taken into consideration in the light of the study's major limitation, which is the age range. Besides being a nationwide sample, the participants were within an age range of 8 to 10 years. Since it limits us to generalize our findings into different developmental stages, studies including adolescents are warranted. Follow-up studies should be done in order to increase our knowledge about the epidemiology of affective disorders in children and adolescents.

8. Conclusion

Major depressive disorder was the most common depressive disorder among Turkish children in this nationwide epidemiological study. This highlights the severe nature of depression and the importance of early interventions. Populations with maternal psychopathology and paternal physical illness may be the most appropriate targets for interventions to prevent and treat depression in children and adolescents.

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All of the authors participating in the study have contributed to the manuscript and approved the final version of the manuscript.

Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

References

Achenbach, T.M., Rescorla, L.A., Ivanova, M.Y., 2012. International epidemiology of child and adolescent psychopathology I: diagnoses, dimensions, and conceptual issues. *J. Am. Acad. Child Adolesc. Psychiat.* 51, 1261–1272.

Agerup, T., Lydersen, S., Wallander, J., Sund, A.M., 2015. Maternal and paternal psychosocial risk factors for clinical depression in a Norwegian community sample of adolescents. *Nord. J. Psychiat.* 69 (1), 35–41.

Angold, A., Costello, E.J., 2006. Puberty and depression. *Child Adolesc. Psychiat. Clin. N Am.* 15 (4), 919–937.

Balazs, J., Miklosi, M., Keresztesy, A., Hoven, C.W., Carli, V., Wasserman, C., Apter, A., Bobes, J., Brunner, R., Cosman, D., Cotter, P., Haring, C., Iosue, M., Kaess, M., Kahn, J.P., Keeley, H., Marusic, D., Postuvan, V., Resch, F., Saiz, P.A., Sisask, M., Snir, A., Tubiana, A., Varnik, A., Sarchiapone, M., Wasserman, D., 2013. Adolescent sub-threshold-depression and anxiety: Psychopathology, functional impairment and increased suicide risk. *J. Child Psychol. Psychiat.* 54, 670–677.

Barkmann, C., Romer, G., Watson, M., Schulte-Markwort, M., 2007. Parental physical illness as a risk for psychosocial maladjustment in children and adolescents: epidemiological findings from a national survey in Germany. *Psychosomatics* 48 (6), 476–481.

Beardslee, W.R., Salt, P., Porterfield, K., Rothberg, P.C., Velde, P.V., Swatling, S., Hoke, L., Moilanen, D.L., Wheelock, L., 1993. Comparison of preventive interventions for families with parental affective disorder. *J. Am. Acad. Child Adolesc. Psychiat.* 32, 254–263.

Bickel, R., 2007. *Multilevel Analysis for Applied Research*. The Guilford Press, New York.

Bilac, O., Ercan, E.S., Uysal, T., Aydin, C., 2014. Prevalence of anxiety and mood disorders and demographic characteristics of elementary school students. *Türk Psikiyatri Dergisi* 25 (3), 171–180 In Turkish.

Birmaher, B., Ryan, N.D., Williamson, D.E., Brent, D.A., Kaufman, J., Dahl, R.E., Perel, J., Nelson, B., 1996. Childhood and adolescent depression: A review of the past 10 years. Part I. *J. Am. Acad. Child Adolesc. Psychiat.* 35, 1427–1439.

Bronsard, G., Alessandrini, M., Fond, G., Loundou, A., Auquier, P., Tordjman, S., Boyer, L., 2016. The prevalence of mental disorders among children and adolescents in the child welfare system: a systematic review and meta-analysis. *Medicine* 95 (7), e2622.

Brotman, M.A., Schmajuk, M., Rich, B.A., Dickstein, D.P., Guyer, A.E., Costello, E.J., Egger, H.L., Angold, A., Pine, D.S., Leibenluft, E., 2006. Prevalence, clinical correlates, and longitudinal course of severe mood dysregulation in children. *Biol. Psychiatry*. 60, 991–997.

Cairns, K.E., Yap, M.B.H., Pilkington, P.D., Jorm, A.F., 2014. Risk and protective factors for depression that adolescents can modify: a systematic review and meta-analysis of longitudinal studies. *J. Affect. Disord.* 169, 61–75.

Carlson, G.A., Weintraub, S., 1993. Childhood behavior problems and bipolar disorder: relationship or coincidence. *J. Affect. Disord.* 28, 143–153.

Carlson, G.A., 1998. Mania and ADHD: comorbidity or confusion. *J. Affect. Disord.* 51, 177–187.

Catalano, R.F., Fagan, A.A., Gavin, L.E., Greenberg, M.T., Irwin, C.E., Ross, D.A., Shek, D.T., 2012. Worldwide application of prevention science in adolescent health. *Lancet* 379, 1653–1664.

Costello, E.J., Angold, A., Burns, B.J., Stangl, D.K., Tweed, D.L., Erkanli, A., Worthman, C.M., 1996. The great smoky mountains study of youth. Goals, design, methods, and the prevalence of DSM-III-R disorders. *Arch. Gen. Psychiat.* 53, 1129–1136.

Cummings, J.R., Case, B.G., Ji, X., Chae, D.H., Druss, B.G., 2014. Racial/ethnic differences in perceived reasons for mental health treatment in U.S. adolescents with major depression. *J. Am. Acad. Child Adolesc. Psychiat.* 53 (9), 980–990.

Demir, T., Karacetin, G., Demir, D.E., Uysal, O., 2011. Epidemiology of depression in an urban population of Turkish children and adolescents. *J. Affective Disord.* 134, 168–176.

Diler, R.S., Uguz, S., Seydaoglu, G., Avci, A., 2008. Mania profile in a community sample of prepubertal children in Turkey. *Bipolar Disord.* 10 (4), 546–553.

Doi, Y., Roberts, R.E., Takeuchi, K., Suzuki, S., 2001. Multi-ethnic comparison of adolescent major depression based on the DSM-IV criteria in a U.S.-Japan study. *J. Am. Acad. Child Adolesc. Psychiat.* 40, 1308–1315.

Emiroglu, F.N., Diler, R.S., 2009. Pediatric bipolar disorders: from the perspective of Turkey. *J. Can. Acad. Child Adolesc. Psychiat.* 18 (3), 206–214.

Ercan, E.S., Bilac, O., Uysal Ozaslan, T., Akoyun Ardıc, U., 2016. Prevalence of psychiatric disorders among Turkish children: the effects of impairment and sociodemographic correlates. *Child Psychiat. Hum. Dev* 47 (1), 35–42.

Ercan, E.S., Bilac, Ö., Uysal Ozaslan, T., Rohde, L.A., 2015. Is the prevalence of ADHD in Turkish elementary school children really high? *Soc. Psychiat. Epidemiol.* 50 (7), 1145–1152.

Findling, R.L., Kowatch, R.A., Post, R.M., 2003. *Pediatric Bipolar Disorder- A Handbook for Clinicians*. Martin Dunitz Ltd., UK.

Geller, B., Luby, J., 1997. Child and adolescent bipolar disorder: a review of the past 10 years. *J. Am. Acad. Child Adolesc. Psychiat.* 36, 68–76.

Geller, B., Williams, M., Zimmerman, B., Frazier, J., Beringer, L., Warner, K., 1998. Prepubertal and early adolescent bipolarity differentiate from ADHD by manic symptoms, grandiose delusions, ultra-rapid or ultradian cycling. *J. Affect Disord.* 51, 81–91.

Gökler, B., Ünal, F., Pehlivanlı, B., Kültür, E.C., Akdemir, D., Taner, Y., 2004. Reliability and Validity of Schedule for Affective Disorders and Schizophrenia for School Age Children-Present and Lifetime Version-Turkish Version (K-SADS-PL-T). *Turk. J. Child. Adolesc. Ment. Health.* 11 (3), 109–116.

Grey, M., Whittemore, R., Tamborlane, W., 2002. Depression in type 1 diabetes in children: natural history and correlates. *J. Psych. Res.* 53, 907–911.

Haahr, M., 2014–2015. *RANDOM.ORG: True Random Number Service*. <https://www.random.org> (Accessed 2014–2015).

Harpold, T.L., Wozniak, J., Kwon, A., Gilbert, J., Wood, J., Smith, L., Biederman, J., 2005. Examining the association between pediatric bipolar disorder and anxiety disorders in psychiatrically referred children and adolescents. *J. Affect. Disord.* 88, 19–26.

Kaufman, J., Birmaher, B., Brent, D., Rao, U.M.A., Flynn, C., Moreci, P., Ryan, N., 1997. Schedule for affective disorders and schizophrenia for school-age children-present and lifetime version (K-SADS-PL): initial reliability and validity data. *J. Am. Acad. Child Adolesc. Psychiat.* 36 (7), 980–988.

Kennard, B.D., Hughes, J.L., Stewart, S.M., Mayes, T., Nightingale-Teresi, J., Tao, R., Carmody, T., Emslie, G.J., 2008. Maternal depressive symptoms in pediatric major depressive disorder: relationship to acute treatment outcome. *J. Am. Acad. Child Adolesc. Psychiat.* 47 (6), 694–699.

Kessler, R.C., Berglund, P., Demler, O., Jin, R., Koretz, D., Merikangas, K.R., Rush, A.J., Walters, E.E., Wang, P.S., 2003. National Comorbidity Survey Replication. The epidemiology of major depressive disorder: results from the National Comorbidity Survey Replication (NCS-R). *JAMA* 289 (23), 3095–3105.

Kieling, C., Baker-Henningham, H., Belfer, M., Conti, G., Ertem, I., Omigbodun, O., Rohde, L.A., Srinath, S., Ulkuer, N., Rahman, A., 2011. Child and adolescent mental health worldwide: evidence for action. *Lancet* 378, 1515–1525.

Klein, R.G., Pine, D.S., Klein, D.F., 1998. Resolved: mania is mistaken for ADHD in prepubertal children. *J. Am. Acad. Child Adolesc. Psychiat.* 37, 1093–1096.

Klein, D.N., Schwartz, J.E., Rose, S., Leader, J.B., 2000. Five-year course and outcome of dysthymic disorder: a prospective, naturalistic follow-up study. *Am J Psychiatry* 157 (6), 931–939.

Kryspin-Exner, I., Felnhöfer, A., 2012. Zur Psychologie des “kleinen Unterschieds”. Betrachtung von Gender-Merkmalen über die Lebensspanne. In: Kautzky-Willer, A. (Ed.), *Gender Medizin: Personalisierte Medizin für Mann und Frau*. Wien Köln Weimar, Böhlau UTB, pp. 17–32.

Lavigne, J.V., Gibbons, R.D., Christoffel, K.K., Arend, R., Rosenbaum, D., Binns, H., Dawson, N., Sobel, H., Isaacs, C., 1996. Prevalence rates and correlates of psychiatric disorders among preschool children. *J. Am. Acad. Child Adolesc. Psychiat.* 35, 204–214.

Lewinsohn, P.M., Klein, D., Seeley, J.R., 1995. Bipolar disorders in a community sample of older adolescents: prevalence, phenomenology, comorbidity, and course. *J. Am. Acad. Child Adolesc. Psychiat.* 34, 454–463.

Lewinsohn, P.M., Rohde, P., Seeley, J.R., Hops, H., 1991. Comorbidity of unipolar depression: I. Major depression with dysthymia. *J. Abnorm. Psychol.* 100 (2), 205–213.

Mathers, C.D., Loncar, D., 2006. Projections of global mortality and burden of disease

- from 2002 to 2030. *PLOS Med.* 3 (11), e442.
- Merikangas, K.R., He, J.P., Rapoport, J., Vitiello, B., Olfson, M., 2013. Medication Use in US youth with mental disorders. *JAMA Pediatr.* 167, 141–148.
- Merikangas, K.R., Nakamura, E.F., Kessler, R.C., 2009. Epidemiology of mental disorders in children and adolescents. *Dialogues Clinical Neurosci.* 11 (1), 7–20.
- Morris, J., Belfer, M., Daniels, A., Flisher, A., Ville, L., Lora, A., Saxena, S., 2011. Treated prevalence of and mental health services received by children and adolescents in 42 low-and-middle-income countries. *J. Child Psychol. Psychiat.* 52, 1239–1246.
- Nobile, M., Cataldo, G.M., Marino, C., Molteni, M., 2003. Diagnosis and treatment of dysthymia in children and adolescents. *CNS Drugs* 17 (13), 927–946.
- Nock, M.K., Green, J.G., Hwang, I., McLaughlin, K.A., Sampson, N.A., Zaslavsky, A.M., Kessler, R.C., 2013. Prevalence, correlates, and treatment of lifetime suicidal behavior among adolescents. *JAMA Psychiat.* 70 (3), 300–310.
- Pine, D.S., Cohen, E., Cohen, P., Brook, J., 1999. Adolescent depressive symptoms as predictors of adult depression: moodiness or mood disorder? *Am. J. Psychiat.* 156, 133–135.
- Polanczyk, G.V., Salum, G.A., Sugaya, L.S., Caye, A., Rohde, L.A., 2015. Annual research review: a meta-analysis of the worldwide prevalence of mental disorders in children and adolescents. *J. Child Psychol. Psychiat.* 56, 345–365.
- Rescorla, L., Ivanova, M.Y., Achenbach, T.M., Begovac, I., Chahed, M., Drugli, M.B., Emerich, D.R., Fung, D.S.S., Haider, M., Hansson, K., Hewitt, N., Jaimes, S., Larsson, B., Maggolini, A., Markovic, J., Mitrovic, D., Moreira, P., Oliveira, J.T., Olsson, M., Ooi, Y.P., Petot, D., Pisa, C., Pomalima, R., Rocha, M.M., Rudan, V., Sekulic, S., Shahini, M., Silveira, E.F.M., Szirovicza, L., Valverde, J., Vera, L.A., Villa, M.C., Viola, L., Woo, B., Zhang, E.Y., 2012. International epidemiology of child and adolescent psychopathology II: integration and applications of dimensional findings from 44 societies. *J. Am. Acad. Child Adolesc. Psych.* 51, 1273–1283.
- Sala, R., Axelson, D., Birmaher, B., 2009. Phenomenology, longitudinal course, and outcome of children and adolescents with bipolar spectrum disorders. *Child Adolesc. Psychiat. Clin. N Am.* 18 (2), 273–289.
- Sanchez, L., Hagino, O., Weller, E., Ronald, W., 1999. Bipolarity in children. *Psychiat. Clin. North Am.* 22, 629–648.
- Sanders, W., Zeman, J., Poon, J., Miller, R., 2015. Child regulation of negative emotions and depressive symptoms: The moderating role of parental emotion socialization. *J. Child Family Studies* 24 (2), 402–415.
- Sarkar, S., Sinha, V.K., Prahara, S.K., 2012. Depressive disorders in school children of suburban India: an epidemiological study. *Social Psychiat. Psychiat. Epidemiol.* 47 (5), 783–788.
- Singh, T., 2008. Pediatric bipolar disorder: diagnostic challenges in identifying symptoms and course of illness. *Psychiatry (Edgmont)* 5 (6), 34.
- Sokratis, S., Christos, Z., Despo, P., Maria, K., 2017. Prevalence of depressive symptoms among school children in Cyprus: a cross-sectional descriptive correlational study. *Child Adolesc. Psychiat. Mental Health* 11 (1), 7.
- Spencer, T.J., Biederman, J., Wozniak, J., Faraone, S.V., Wilens, T.E., Mick, E., 2001. Parsing pediatric bipolar disorder from its associated comorbidity with the disruptive behavior disorders. *Biol. Psychiat.* 49, 1062–1070.
- Substance Abuse and Mental Health Services Administration (SAMHSA), 2014. Results from the 2013 National Survey on Drug Use and Health: Mental Health Findings, NSDUH Series H-49, HHS Publication No. (SMA) 14-4887. Rockville, MD.
- Thapar, A., Collishaw, S., Pine, D.S., Thapar, A.K., 2012. Depression in adolescence. *Lancet* 379, 1056–1067.
- Toros, F., Bilgin, N.G., Bugdayci, R., Sasmaz, T., Kurt, O., Camdeviren, H., 2004. Prevalence of depression as measured by the CBTI in a predominantly adolescent school population in Turkey. *Eur. Psychiat.* 19, 264–271.
- Turgay, A., Ansari, R., 2006. Major depression with ADHD: In children and adolescents. *Psychiatry (Edgmont)* 3 (4), 20–32.
- Vicente, B., Saldivia, S., de la Barra, F., Kohn, R., Pihan, R., Valdivia, M., Riosco, P., Melipillan, R., 2012. Prevalence of child and adolescent mental disorders in Chile: a community epidemiological study. *J. Child Psychol. Psychiat.* 53, 1026–1035.
- Weckerly, J., 2002. Pediatric bipolar mood disorder. *J. Dev. Behav. Pediat.* 23, 42–56.
- Weller, E.B., Calvert, S.M., Weller, R.A., 2003. Bipolar disorder in children and adolescents—diagnosis and treatment. *Curr. Opin. Psychiat.* 16, 383–388.
- Yang, H.J., Soong, W.T., Kuo, P.H., Chang, H.L., Chen, W.J., 2004. Using the CES-D in a two-phase survey for depressive disorders among nonreferred adolescents in Taipei: a stratum-specific likelihood ratio analysis. *J. Affective Disorders* 82, 419–430.
- Yang, N., He, Y., Zhang, Z., Dong, H.M., Zhang, L., Zhu, X.T., Hou, X.H., Wang, Y.S., Zhou, Q., Gong, Z.Q., Cao, L.Z., Wang, P., Zhang, Y.W., Sui, D.Y., Xu, T., Wei, G.X., Yang, Z., Jiang, L., Li, H.J., Feng, T.Y., Chen, A., Qiu, J., Chen, X., Liu, X., Zuo, X.N., 2017. Chinese color nest project (CCNP): growing up in China. *Chin. Sci. Bull.* 62 (26), 3008–3022.