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Prevalence of child and adolescent mental disorders in Chile: a community epidemiological study

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Background: In Latin America, there is limited research on the prevalence of mental disorders in children and adolescents. This Chilean survey is the first national representative survey in the Latin American region to examine the prevalence of Diagnostic and Statistical Manual-IV (DSM-IV) psychiatric disorders in the region in children and adolescents. **Methods:** Subjects aged 4–18 were selected using a stratified multistage design. The Diagnostic Interview Schedule for Children version IV (DISC-IV) was used to obtain 12-month DSM-IV diagnoses of affective, anxiety, conduct and substance use disorders, and supplemented with questionnaires examining family risk factors, family income, and service utilization. The parent or the primary caretaker was interviewed for children, aged 4–11, using the DISC-IV; however, adolescents, aged 12–18, were directly interviewed. **Results:** A sample of 1558 children and adolescents was evaluated. Using the most stringent DISC-IV impairment algorithm, the prevalence rate for any psychiatric disorders was 22.5% (19.3% for boys and 25.8% for girls). The prevalence rate was higher among the children, aged 4–11, in comparison with adolescents, aged 12–18 (27.8% and 16.5%, respectively). Less than half of the subjects in need of services sought some form of assistance. Nearly a quarter of those using services did not present with a psychiatric diagnosis in the past year. Comorbidity was found in 24.8% of those with a disorder, but only 6.3% had three or more diagnoses. **Conclusions:** The prevalence of psychiatric disorders in Chile is high among children and adolescents. This study highlights the increasing need to reevaluate mental health services provided to children and adolescents in Latin America. **Keywords: Children,** adolescent, epidemiology, mental disorders, prevalence, Latin America. **Abbreviations:** ADHD, attention-deficit hyperactivity disorder; CIDI-A, Composite Diagnostic Interview; DISC-IV, Diagnostic Interview Schedule for Children version IV; DAWBA, Developmental and Well-Being Assessment; DSM-IV, Diagnostic and Statistical Manual-IV; FAD, Family Assessment Device; GAD, generalized anxiety disorder; MDD, major depressive disorder; ODD, oppositional-defiant-disorder; OR, odds ratio; SACA, Service Assessment for Children and Adolescents; WHO, World Health Organization; 95% CI, 95% confidence interval.

Introduction

There has been a growing need to better understand the prevalence and associated factors for mental health problems in children and adolescents in Latin America. In 2005, a sizable proportion of the population was less than 15 years old, ranging from 35.7% in Central America to 27.2% in the Southern Cone, which includes Chile, in contrast to 18.8% for North America (Pan American Health Organization, 2010). The growing pandemic of violence and substance use has made more pressing an understanding of the mental health needs of children and adolescents in the region. The World Health Organization, (2005) (WHO) has emphasized that psychiatric disorders with onset in childhood and adolescence should be a matter of public health concern, as highlighted by the publication of the Atlas devoted to child and adolescent mental health resources.

Despite the need for information on the mental health of children and adolescents in the region, research in most countries is scarce. Studies examining the prevalence of disorders in children using diagnostic instruments have been limited to Brazil (Anselmi, Fleitlich-Bilyk, Menezes, Araújo, & Rohde, 2010; Fleitlich-Bilyk & Goodman, 2004; Goodman et al., 2005) Puerto Rico (Bird et al., 1988; Shaffer et al., 1996; Canino et al., 2004), and Mexico (Benjet, Borges, Medina-Mora, Zambrano, & Aguilar-Gaxiola, 2009). In Venezuela (Montiel-Nava et al., 2002) and Colombia, (Cornejo et al., 2005; Pineda et al., 1999) studies were also conducted, but limited to attention-deficit hyperactivity disorder (ADHD). The prevalence surveys conducted in Brazil were limited to children, and the Mexican survey was limited to adolescents. In Chile, there was an earlier report on 1st and 6th grade schoolchildren; however, it employed a nonstandardized semistructured clinical interview conducted by child psychiatry fellows (de la Barra, Toledo, & Rodríguez, 2004). Earlier studies in Latin America (Duarte et al., 2003) and in Chile

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(Bralio, Ximena, & Hernan, 1987) were based on screening instruments. Other than the studies conducted in Puerto Rico, which were island-wide, no prior studies have been conducted on a national representative sample in the region. In their review of ADHD in Latin America, Polanczyk et al. (2008) highlighted that there was a complete absence of national surveys concerning children's mental health in the region, and studies that generated evidence pertaining to specific populations could only be found in three of 46 countries. Merikangas, Nakamura, and Kessler (2009), in arguing that the United States was in need of a national mental health survey, stated 'The absence of empirical data on the magnitude, course, and treatment patterns of mental disorder in a nationally representative sample of US youth has impeded efforts essential for establishing mental health policy'. Only recently has the US conducted studies on child and adolescent mental health at a national level (Merikangas, He, Brody, et al., 2010; Merikangas, He, Burstein, et al., 2010). Clearly, the argument is even stronger for Latin America where limited resources in child and adolescent mental health exist, as their mental health needs have not been fully met even in developed countries (WHO, 2005).

The purpose of the present study was to obtain prevalence rates of psychiatric disorders in a representative national sample of Chilean child and adolescents. This report focuses on the DSM-IV 12-month prevalence rates of disorders and the associated sociodemographic correlates, comorbidity, and service utilization.

Method

Sample selection

A stratified household sample representative of the country's child, aged 4–11, and adolescent, aged 12–18, populations were obtained. Chile consists of 51 provinces, grouped into 15 regions, with a population of approximately 17 million, of which 5.3 million are less than 19 years old.

The sample of children and adolescents was selected from four geographically distinct provinces, chosen as due to being representative of the distribution of the national population: Santiago, Concepcion, Iquique, and Cautin. One third of the nation's population resides in the capital city, Santiago. Concepcion is located in the central region of Chile and is the second largest city. Iquique is in the north of the country and is a desert region, with many isolated towns. The province of Cautin, in the south, is a sparsely populated rural area. Most of Chile's population, 89%, is comprised of urban dwellers.

In Chile, provinces are subdivided into municipalities, comunas, then districts, and finally into blocks, each of which was selected randomly. The number of households available on each block was counted. Using the 2002 national census, the number of households required on each block was determined. The households were chosen clockwise, starting with the first one on the northeast corner using a computer algorithm specially designed for this purpose. Twelve homes per block were identified and 5 were surveyed. Selection of the child or adolescent to be interviewed was based on their birth date being the closet to the interview date. If more than one child had the same birth date, ties were resolved by a coin toss or the use a Kish table in the event of more than one tie. The targeted sample size was determined based on obtaining a probability sample that had a prevalence of psychiatric disorders of 18%, according to the DISC-IV study from Puerto Rico, with a 95% confidence interval and maximum standard error of 1.75 (Canino et al., 2004).

The survey was conducted by the University of Concepcion's Department of Psychiatry and University of Chile's East Mental Health Department between April 2007 and December 2009. The sites were completed in the following order: Cautín, Santiago, Iquique, and Concepcion.

Measures

The presence of a psychiatric disorder was accessed using the DISC-IV, Spanish computer version (Bravo et al., 2001; Shaffer, Fischer, Lucas, Dulcan, & Schwab-Stone, 2000), previously adapted and validated for Chile (Saldivia et al., 2008). Interviews took place in the home, in a private space without others present directly with the adolescent or the parent or primary caretaker of children (74.8% mother, 9.3% father, 7.8% grandparent, 5.1% sibling, 3.0% other), aged 4–11 years, by psychology graduate students trained in the instrument's use. Mental disorders selected for evaluation were social phobia, separation anxiety disorder, generalized anxiety disorder (GAD), eating disorder, major depressive disorder, dysthymia, schizophrenia, ADHD, oppositional-defiant (ODD), conduct disorder, alcohol use disorders, cannabis use disorders, nicotine dependence, and other substance use disorders.

The four impairment algorithms contained in the DISC-IV interview were ascertained according to the extent in which symptoms in six domains had stressed the child or affected his or her school achievement, or relationships with caretakers, family, friends, or teachers. Impairment criteria A required that at least one of the impairments is given an intermediate or severe rating (sometimes or many times; bad or very bad); criteria B required at least two intermediate or severe impairments; criteria C, at least one impairment in the severe category; and criteria D required that criterion B or C is present, i.e., at least two intermediate or one severe criteria. Criteria D were used in this analysis as the measure of impairment.

Service utilization, private and public sector, for emotional, behavioral, psychiatric, and substance use problems in the past 12 months was investigated. School-based services included counseling, special educations, or other interventions for behavioral issues. Formal mental health services included both inpatient psychiatric treatment and outpatient treatment by a mental healthcare professional. Other medical services were defined as care delivered by the formal healthcare system that was not provided by a mental healthcare

professional. Social services included institutions that may provide assistance for behavioral or emotional problems outside the healthcare system or school, such as a juvenile program, prison, or family programs. Other services include counseling from religious leaders, curanderos, other healers, as well as social groups. Information about use of mental health services was based on the Service Assessment for Children and Adolescents (SACA) (Canino et al., 2002). The SACA has been shown to be valid when administered only to the adolescent without parental input (Stiffman et al., 2000). In addition, family functioning was examined using the 12-item global functioning scale of the Family Assessment Device (FAD) (Epstein, Baldwin, & Bishop, 1983; Ridenour, Daley, & Reich, 1999), which is a subscale of the FAD, which measures overall health or pathology in the family and its psychometric properties previously evaluated in Chile (Barroihet, Cano-Prous, Cervera-Enguix, Forjaz, & Gullén-Grima, 2009). Family psychiatric history was obtained using the Family History Screen (Weissman et al., 2000). Family income was measured based on the amount that family income was above the poverty line as defined in Chile as of November 2009, in $US per year rural areas, $4,249.46, and urban areas, $6,334,32, and analyzed as a categorical variable (poverty ≤ 2; poverty ≤ 5 but > 2; poverty ≤ 8 and > 5; poverty > 8).

Upon completion, the research team reviewed each interview independently, and discrepancies were addressed with interviewers to obtain clarification or corrections. Homes where participation was refused were not replaced; replacement was performed only for those homes where no child or adolescent resided.

Statistical analysis

The additional data collected that were not part of the DISC-IV was entered into an STATA 11.0 database (StataCorp LP, College Station, TX), using double digitations for quality control. DISC-IV yields 12 months DSM-IV diagnoses. Prevalence rate estimates and the corresponding standard errors were obtained using STATA to take into account the complex sample design. Logistic regression was used to examine association of mental disorders with sociodemographic variables and other potential risk factors. First-order Taylor series linearization was used to calculate odds ratios, 95% confidence intervals, and p values.

Multivariate logistic regression was used to examine which risk factors were the best predictors for mental disorders. Variables entered into multivariate logistic regression model were selected based on a Rao Scott F statistic $p < .25$.

Samples were weighted for selection probabilities in each stage: municipality, district, block, home, and child. In addition, a post-stratification adjustment for gender and age was performed to ensure that the data analysis was based on the population from the 2002 census.

Written informed consent was obtained from the adult responsible for each child. To assure confidentiality, the data analysis team did not have access to any identifying information. The adult responsible for each child or the adolescent was offered the opportunity to receive the diagnostic results by certified letter based on the DISC-IV upon request. Identified cases were recommended to seek treatment in the local mental health network. Unfortunately, this did not guarantee that treatment would effectively take place as it depended on the caretaker's or the adolescent's following through with recommendations and availability of mental health resources. The ethical research committees of the University of Concepcion and that of the funding institution approved the study.

Results

A total of 1558 individuals were interviewed, 50.9% boys and 49.1% girls. More than half of the sample, 52.9%, consisted of children, 4–11 years of age, and 47.1% were adolescents, aged 12–18. The refusal rate was acceptable with a response rate of 82.4%.

Prevalence

Table 1 shows the 1-year prevalence of specific diagnoses. The prevalence rate for all disorders was 38.3% without impairment and 22.5% when impairment was taken into account. The most prevalent diagnostic group were disruptive disorders, 14.6%, followed by anxiety disorders, 8.3%, and affective disorders, 5.1%, including impairment. Substance use disorders in children and adolescents had a prevalence of 1.2%. Eating disorders and schizophrenia were relatively rare.

Sociodemographic correlates

Table 2 shows the relationship between diagnostic groups and sociodemographic risk factors. In comparison with boys, girls had a higher risk for developing anxiety disorders. More specifically, girls were at a higher risk than boys for social phobia [OR = 3.4, 95% CI (1.3–8.6)] and for GAD [OR = 4.5, 95% CI (1.8, 11.5)]. A gender difference in the prevalence rate for affective disorders was not seen when impairment was taken into account. Interestingly, no gender differences were noted for disruptive or substance use disorders. When children and adolescents were analyzed independently; no gender differences were found for children. However, for anxiety disorders [OR = 5.5, 95% CI (2.0–15.3)] and for mood disorders [OR = 4.1, 95% CI (1.2–13.7)], girls had significantly higher rates than boys, but not for substance use disorders or disruptive disorders.

Few statistically significant differences in prevalence rates were noted between children and adolescents. When impairment was included, the significant differences between age groups and affective disorders was no longer noted. Although overall children had higher rates of disruptive disorders, this was not the case for each of the specific disorders. For ADHD [OR = 0.3, 95% CI (0.1, 0.5)] and ODD [OR = 0.3, 95% CI (0.1, 0.6)] adolescents

Table 1 12-month prevalence rates of DSM-IV mental disorders including impairment in Chile (N = 1558)

	Total		Male		Female		Age 4–11		Age 12–18	
		SE		*SE*		*SE*		*SE*		*SE*
Anxiety disorders	8.3	0.9	5.8	0.9	11.0	1.7	9.2	1.1	7.4	1.4
Social phobia	3.7	0.8	1.8	0.7	5.7	1.5	3.5	0.9	3.9	1.2
Generalized anxiety disorder	3.2	0.5	1.2	0.5	5.3	0.9	3.8	1.0	2.6	1.0
Separation anxiety disorder	4.8	0.6	4.0	0.8	5.7	0.9	6.1	0.9	3.4	1.0
Affective disorders	5.1	0.9	3.2	0.9	7.1	1.8	3.5	1.1	7.0	1.5
Major depressive disorder	5.1	0.9	3.1	0.9	7.0	1.8	3.4	1.1	6.9	1.5
Dysthymia	0.1	0.03	0.1	0.04	0.1	0.04	0.04	0.03	0.1	0.05
Disruptive disorders	14.6	1.1	13.5	1.3	15.8	2.3	20.6	2.1	8.0	1.7
Conduct disorder	1.9	0.4	2.7	0.8	1.0	0.4	0.9	0.3	2.9	0.9
ODD	5.2	0.5	4.5	0.7	5.9	0.9	7.8	0.9	2.3	0.7
ADHD	10.3	0.9	9.7	1.2	10.9	2.0	15.5	1.6	4.5	1.4
Substance use disorders	1.2	0.4	1.4	0.5	1.1	0.5	–	–	2.6	0.8
Alcohol abuse	0.3	0.1	0.6	0.3	0.1	0.1	–	–	0.7	0.3
Alcohol dependence	0.4	0.2	0.8	0.3	0.1	0.1	–	–	0.9	0.4
Cannabis abuse	–	–	0.04	0.04	–	–	–	–	0.05	0.05
Cannabis dependence	0.2	0.2	0.1	0.1	0.3	0.3	–	–	0.4	0.4
Nicotine dependence	0.3	0.1	0.1	0.1	0.4	0.3	–	–	0.5	0.3
Other substance abuse	–	–	–	–	–	–	–	–	–	–
Other substance dependence	0.1	0.1	0.03	0.02	0.2	0.2	–	–	0.2	0.2
Eating disorders	0.2	0.1	0.05	0.05	0.3	0.3	0.1	0.1	0.3	0.3
Schizophrenia	0.1	0.1	–	–	0.3	0.3	–	–	0.3	0.3
Any disorder	22.5	1.6	19.3	1.8	25.8	2.8	27.8	2.2	16.5	2.0
Number of comorbid disorders among those with any disorders										
1 disorder	75.2	3.5	80.1	4.3	71.5	4.7	84.1	3.3	58.4	6.3
2 disorders	18.5	2.4	16.5	3.5	20.1	3.3	11.9	2.5	31.0	5.5
3 or more disorders	6.3	2.8	3.5	0.9	8.4	2.6	4.0	1.6	10.6	7.1

ADHD, attention-deficit hyperactivity disorder; DSM-IV, Diagnostic and Statistical Manual-IV; ODD, oppositional-defiant-disorder. Data weighted to 2002 census of Chile.

Table 2 Sociodemographic correlates of 12-month prevalence rate of DSM-IV mental disorders including impairment bivariate results (N = 1558)

	Anxiety disorders		Affective disorders		Disruptive disorders		Substance use disorders		Any disorder	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Gender										
Male	1.0		1.0		1.0		1.0		1.0	
Female	2.0**	(1.2–3.3)	2.3	(1.0–5.6)	1.2	(0.8–1.9)	0.8	(0.7–1.6)	1.5	(1.0–2.2)
Age (years)										
4–11	1.0		1.0		1.0		–	–	1.0	
12–18	0.8	(0.5–1.2)	2.1	(0.9–4.6)	0.3***	(0.2–0.6)	–	–	0.5***	(0.4–0.7)
Family income										
Poverty ≤ 2	1.0		1.0		1.0		1.0		1.0	
Poverty ≤ 5	0.6	(0.3–1.1)	0.9	(0.4–2.3)	1.4	(0.6–2.8)	0.1*	(0.04–0.5)	1.0	(0.6–1.8)
Poverty ≤ 8	0.4**	(0.2–0.8)	0.6	(0.2–1.9)	1.4	(0.6–3.3)	0.6	(0.1–2.6)	0.9	(0.4–2.0)
Poverty > 8	0.4*	(0.2–0.8)	0.7	(0.2–2.6)	0.9	(0.3–2.2)	0.7	(0.2–2.2)	0.9	(0.5–1.6)
Family Functioning	0.5**	(0.3–0.7)	0.3*	(0.1–0.8)	0.5**	(0.3–0.8)	0.2***	(0.2–0.7)	0.5***	(0.3–0.7)
Family psychopathology										
No	1.0		1.0		1.00		1.0		1.0	
Yes	3.4	(1.5–6.6)	6.2**	(1.8–20.7)	3.6***	(1.7–7.5)	2.2	(1.0–5.4)	3.3***	(2.4–4.5)
Family structure										
Both parents	1.0		1.0		1.00		1.0		1.0	
Single parent	2.0*	(1.1–3.5)	3.5***	(1.8–6.7)	2.4***	(1.5–4.0)	2.3	(1.0–3.6)	2.5***	(1.8–3.5)
Other	2.7*	(1.3–5.5)	4.3***	(2.1–8.7)	1.5	(0.8–2.8)	2.3	(0.7–8.6)	1.9*	(1.1–3.3)

DSM-IV, Diagnostic and Statistical Manual-IV; OR, odds ratio; 95% CI, 95% confidence interval.
Data weighted to 2002 census of Chile. Family functioning OR < 1 is poor functioning. Family functioning an OR < 1 suggests poorer family functioning.
*p < .05; **p < .01; ***p < .001; –, no cases.

had lower prevalence rates than children. However, for conduct disorder, adolescents had higher rates than children [OR = 3.2, 95% CI (1.2, 8.4)]. Statistically significant differences were not found between the two age groups for anxiety disorders. None of the children, but only adolescents, in this

study were diagnosed with a substance use disorders.

Perception of poorer family function was significantly associated with each of the categories of mental disorders. The family structure was related to child and adolescent mental health. With the exception of substance use disorders, children living with only one parent had significantly higher rates of mental disorders. Parental psychopathology was a risk factor for affective and disruptive disorders, but not anxiety disorders or substance use disorders. Family income was inversely related to anxiety disorders.

Multiple logistic regression

The results of the multiple logistic regression models are presented taking into account impairment in Tables 3. For anxiety disorders, female gender, family income, history of psychopathology, and living with only one parent remained statistically significant. A positive family history and not living with both parents were significant in the multiple logistic regression model for affective disorders; gender was not significant. The significant risk factors for conduct disorders were being an adolescent, a positive family psychiatric history, living with only one parent, and poor family functioning. There were few significant correlates in the model for substance use disorders. For substance, poor family functioning and being in the highest income group were significant. When any disorder was examined in the regression model, being an adolescent, family psychopathology, living with only one parent, and poor family functioning were statistically significant, but not gender.

Comorbidity

Comorbidity when impairment was included (n = 329) was seen in nearly a quarter of those with a disorder, 24.8%, with 6.3% having three or more disorders. Gender differences, girls having higher rates of mental disorders than boys, were appreciated only in those with comorbidity (Table 4). Poor family functioning, having parental psychopathology, and not living with both parents, had an increased risk for mental disorders whether or not comorbidity was present. However, an inverse relationship with family income and mental disorders was only seen in those with three or more comorbid disorders.

Service utilization

In all, 41.6% of the interviewed subjects having a disorder including impairment had sought assistance either formally or informally due to a behavioral, emotional, psychiatric, or substance use-related problem. The most frequent source for help-seeking were school-based services, 21.9%, followed by the formal mental health services, 19.1%. Only 5.3% of the subjects contacted traditional healers, alternative medicine or self-aid groups (Table 5). A

Table 3 Multivariate logistic regression of 12-month prevalence rate of DSM-IV mental disorders including impairment (N = 1558)

	Anxiety disorders		Affective disorders		Disruptive disorders		Substance use disorders		Any disorder	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Gender										
Male	1.0		1.0						1.0	
Female	2.0*	(1.2–3.3)	2.2	(0.9–5.6)					1.4	(1.0–2.1)
Age (years)										
4–11			1.0		1.0				1.0	
12–18			2.0	(0.9–4.5)	0.3***	(0.1–0.6)			0.5***	(0.3–0.7)
Family income										
Poverty ≤ 2	1.0						1.0			
Poverty ≤ 5	0.6	(0.3–1.1)					0.1**	(0.04–0.5)		
Poverty ≤ 8	0.4**	(0.2–0.8)					0.6	(0.1–2.8)		
Poverty > 8	0.4*	(0.1–0.8)					0.8	(0.2–2.4)		
Family Functioning	0.6	(0.3–1.1)	0.4	(0.1–1.3)	0.4**	(0.2–0.8)	0.2***	(0.1–0.4)	0.5***	(0.4–0.7)
Family psychopathology										
No	1.0		1.0		1.00		1.0		1.0	
Yes	3.1**	(1.4–7.0)	5.5**	(1.6–18.7)	2.9**	(1.4–6.2)	1.4	(0.4–5.2)	2.8***	(2.0–3.9)
Family Structure										
Both parents	1.0		1.0		1.00				1.0	
Single parent	1.7	(0.9–3.0)	2.8*	(1.3–5.9)	2.3**	(1.3–3.9)			2.3***	(1.6–3.3)
Other	2.0	(0.9–4.5)	3.4*	(1.3–8.5)	1.2	(0.6–2.5)			1.6	(0.9–3.1)

DSM-IV, Diagnostic and Statistical Manual-IV; OR, odds ratio; 95% CI, 95% confidence interval.
Family functioning OR < 1 is poor functioning. Family functioning an OR < 1 suggests poorer family functioning. Variables that do not contain odds ratio information were not entered into the multivariate model as the criteria of a Rao Scott F statistic p < .25 was not met. Data weighted to 2002 census of Chile.
*p < .05; **p < .01; ***p < .001.

Table 4 Sociodemographic correlates of 12-month prevalence of DSM-IV comorbidity including impairment (*N* = 329)

	1 Diagnosis		2 Diagnoses		≥ 3 Diagnoses	
	OR	95% CI	OR	95% CI	OR	95% CI
Gender						
Male	1.0		1.0		1.0	
Female	1.3	(0.9–2.0)	1.8*	(1.0–3.1)	3.5	(0.6–20.6)
Age (years)						
4–11	1.0		1.0		1.0	
12–18	0.4*	(0.2–0.6)	0.3	(0.8–2.4)	1.4	(0.3–7.2)
Family income						
Poverty ≤ 2	1.0		1.0		1.0	
Poverty ≤ 5	1.2	(0.6–2.2)	1.3	(0.7–2.5)	0.4*	(0.1–1.0)
Poverty ≤ 8	1.2	(0.5–2.8)	0.7	(0.3–1.4)	0.3	(0.1–2.1)
Poverty > 8	1.2	(0.6–2.3)	0.7	(0.3–1.5)	0.01***	(0.0–0.1)
Family Functioning	0.6	(0.4, 1.2)	0.2***	(0.1, 0.4)	0.1***	(0.02–0.3)
Family psychopathology						
No	1.0		1.0		1.0	
Yes	2.8***	(1.9–4.0)	4.9*	(1.5–16.5)	–	–
Family structure						
Both parents	1.0		1.0		1.0	
Single parent	2.2***	(1.5–3.3)	4.1***	(2.4–7.0)	3.1	(0.6–15.2)
Other	1.4	(0.7–2.9)	4.0***	(1.4–12.0)	4.6**	(1.9–11.5)

DSM-IV, Diagnostic and Statistical Manual-IV; OR, odds ratio; 95% CI, 95% confidence interval.
Family functioning OR < 1 is poor functioning. Family functioning with an OR < 1 suggests poorer family functioning. Data weighted to 2002 census of Chile.
*p < .5; **p < .01; ***p < .001; –, no cases.

Table 5 Use of services for emotional, psychiatric, or substance use problems based on 12-month prevalence of DISC-IV diagnosis including impairment (*N* = 1558)

	DISC-IV diagnosis								
	No diagnosis (*N* = 1229)			Any disorder including impairment (*N* = 329)			All subjects that utilized services (*N* = 358)		
	n	%	*SE*	*n*	%	*SE*	*n*	%	*SE*
School services	109	9.0	1.6	72	21.9	4.3	181	51.5	4.6
Formal mental health services	86	6.4	0.8	58	19.1	3.8	144	40.1	3.4
Other medical services	23	2.2	0.7	21	5.9	2.0	44	13.0	2.6
Social services	2	0.3	0.2	4	0.6	0.4	6	1.4	0.8
Other services	19	1.3	0.4	15	5.3	2.9	34	9.6	2.7
Any services	225	17.8	1.8	133	41.6	2.2	358	100	

DISC-IV, Diagnostic Interview Schedule for Children version IV.
More than one service type may be used per case; No diagnosis = does not have a diagnosis including impairment. Data weighted to 2002 census of Chile.

majority, 58.4% of children and adolescents who had a mental disorder including impairment, did not receive assistance of any form.

Discussion

This is the first nationally representative child and adolescent survey of mental disorders conducted in Latin America. The results found that nearly a quarter of the children and adolescent in Chile have disorders that include impairment. Overall, disorders were associated with poorer family functioning, family psychopathology, and not living with both parents in both bivariate and multivariate models. Comorbidity was found in over a third of those with a disorder. Most children in need of mental health services did not receive assistance. There was a treatment gap of 58.4% among those with impairment for any type of treatment and treatment gap of 80.9% with the formal mental health system.

Interestingly, nearly 18% of those without a diagnosis used mental health services. If one takes into account disorders without impairment and subthreshold cases, the rate is decreased to 8.1%. As lifetime prevalence was not measured, those who may no longer be symptomatic but are in treatment and in remission could account for a sizeable proportion of the those seeking help, as well as persons with disorder that were not included in the survey (manic episodes, specific phobia, posttraumatic stress disorder, obsessive-compulsive disorder, and panic disorder).

This study had a number of strengths. Unlike most child and mental health studies in the region, an internationally validated diagnostic interview schedule was used rather than screening instruments. Previous validation in a local sample made it possible to use the DISC-IV interview in Chile. The response rate was satisfactory in comparisons with studies that report it, higher than several (Ford, Goodman, and Meltzer, 2003; Heiervang et al., 2007), comparable to others (Merikangas, He, Burstein, et al., 2010), and lower than some (Fleitlich-Bilyk & Goodman, 2004). Unlike many of the studies conducted in Latin America region, we used a broad age rather than a narrow age range. In addition, we collected risk factor data rarely obtained in child psychiatric epidemiological studies in Latin America including parental psychopathology, family functioning, and family income, and most importantly, service utilization.

This study has a number of limitations. Most researchers have tried to combine information from multiple informants, such as obtaining additional information from teachers for children and from parents for adolescents. In a British study, information from teachers persuaded the clinician to make more diagnoses of disruptive disorders than they would have made based on the parent's information alone (Ford, Goodman, & Meltzer, 2003). In Latin America, community-based methods rather than school-based studies are needed. Relying on schools rather than household sampling in the region may miss potentially vulnerable children, as they may not attend school even though compulsory. This approach captured nearly all the vulnerable child and adolescent population, as only 0.28% of all children in Chile reside in institutions, and of the homeless population. 9.3% is less than age 18 or about 675 persons based on a 2005 national survey of the homeless (Minoletti, 2010). Although it may have been ideal to interview the parent, as well the adolescent, this was not done in this study. It has been recommended that for adolescents, the parent and adolescent version of the DISC be administered and a positive response in either be considered (Bird, Gould, & Staghezza, 1992; Lahey et al., 1996; Piacentini, Cohen, & Cohen, 1992). Investigators have also suggested parents under-report compared with their children (Weissman et al., 1987). In the current study, adolescents had a prevalence rate for all disorders of 33.2% excluding impairment; it is not clear how much more a parent would therefore contribute. In addition, an issue that merits investigation is if adolescent may be less likely to acknowledge symptoms if they were aware that the parent was also interviewed.

Another possible weakness of this study is that we did not add a global impairment measure independent of the impairment criteria already incorporated in the DISC-IV. Canino et al. (2004) has discussed the need not to rely exclusively on the DISC impairment measures, which are specific for each diagnosis, as the DISC evaluates only a selected group of DSM-IV diagnoses. An external measure of impairment permits identification of children who may be impaired, but do not have a diagnosis.

Recently, the sociocultural applicability of the DISC-IV has been raised in a study in South Africa (Sharp, Skinner, Serekoane, & Ross, 2011). Although this is an important issue, the DISC-IV has been used in Spanish-speaking populations previously (Bird et al., 1988; Canino et al., 2004; Shaffer et al., 1996) and has undergone clinical validation in Chile (Saldivia et al., 2008).

In comparison with other Latin American studies, the rates we obtained may be considered high, but in line with more recent studies. The three studies conducted in Brazil all used the Developmental and Well-Being Assessment (DAWBA) (Goodman, Ford, Richards, Meltzer, & Gatward, 2000). The study conducted in Taubate had a prevalence rate for all disorders of 12.7% (Fleitlich-Bilyk & Goodman, 2004), the one in Ilha de Mare, 7.0% (Goodman et al., 2005) and Pelotas, 10.8%. (Anselmi et al., 2010). This is in contrast to the rate of 22.5% including impairment that we obtained. Two of the DAWBA studies used a two-stage procedure that may have been overly selective (Anselmi et al., 2010; Goodman et al., 2005); these studies incorporated a clinician appraisal that may also have resulted in lower rates. These studies were also limited to children aged 7–14 (Fleitlich-Bilyk & Goodman, 2004; Goodman et al., 2005) and 11–12 (Anselmi et al., 2010). In our study, children had a significantly higher prevalence rate for all mental disorders than did adolescents, further highlighting the contrast between our findings and those in Brazil and raising issues of methodological differences. In comparison with the study conducted in Puerto Rico using the DISC-IV, reporting 19.8% excluding impairment among 4–17 year olds (Canino et al., 2004), our results seem to be markedly elevated, 38.3% excluding impairment. More recently, a survey of adolescents, aged 12–17, in Mexico City (Benjet, Borges, Medina-Mora, Zambrano, et al., 2009) using the Composite Diagnostic Interview (CIDI-A) (Merikangas, Avenevoli, Costello, Koretz, & Kessler, 2009), obtained a prevalence rate of 39.4% excluding impairment, which is even higher than the 33.2% we obtained in Chile; however, the inclusion of specific phobia with a prevalence of 20.9% may account for this difference. Otherwise, our prevalence including impairment is remarkably similar to that obtained by Merikangas et al. (2010b) among US adolescents, 22.0%.

It is surprising that statistical significance with family income was obtained only for anxiety disorders, as other studies have found stronger associations for externalizing rather than internalizing disorders (Lipman, Offord, & Boyle, 1996; McLoyd, 1998). Several studies since 2000 have noted a relationship only with internalizing disorders or

anxiety disorders as noted in Chile (Carter et al., 2010; Farbstein et al., 2010; Roberts, Roberts, & Xing, 2007). Environment-related stressors have been found to partially mediate the association between mental health problems and socioeconomic position (Amone-P'Olak et al., 2009).

When children and adolescents were examined separately, girls had markedly higher rates of mood and anxiety disorders than boys, for adolescents but not for children. This is consistent with the literature that suggests that with the onset of menarche, the burden of illness for depression shifts toward a 2:1 ratio for girls compared to boys (Born, Shea, & Steiner, 2000). In Chile, among adolescents, girls had a prevalence of 11.1% compared to boys 3.0%, while among children, the rates were 3.6% and 3.4%, respectively.

In Chile, although not statistically significant, girls were found to have slightly higher rates of ADHD and ODD than boys. ADHD and externalizing disorders in general are almost universally higher in boys (Polanczyk & Rohde, 2007; Skounti, Philalithis, & Galanakis, 2007). Interestingly, although not statistically significant, higher rates for impulse control disorders among girls, which includes ADHD, were noted in the Mexican CIDI-A study (Benjet, Borges, Medina-Mora, Mendez, et al., 2009) and in a Brazilian ADHD school-based investigation (Rohde et al., 1999). In a prevalence study of ADHD in Venezuela of 1141 school children, the rates were also noted to be higher among girls (Montiel-Nava et al., 2002). The reasons why elevated rates in girls or nearly equal rates with boys have been found in some Latin American epidemiological studies for ADHD merit further research.

Conclusion

This nationally representative study of mental disorders in children and adolescents highlights the extraordinarily high treatment gap that exists for child and adolescent mental health services in the region. Further information in Latin America is needed on how mental health care is provided to children and adolescents in Latin America. A 2003 review of mental health care for children and adolescents in Latin America reported that data on treatment gap did not exist (Duarte et al., 2003). Undoubtedly, what Polanczyk et al. (2008) stated about treatment of ADHD in Latin America may be true for all disorders, that the type of psychosocial treatment used in community settings is frequently not empirically supported and the existing resources for effective treatment are scarce. Berganza (2005), in an editorial on the state of child mental health care in Latin America, argued that the current status of care in the region was a violation of children's rights. This study in Chile highlights the increasing need to re-evaluate mental health services in the region.

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Key points

- Nearly a quarter of children and adolescents in Chile have a psychiatric disorder with impairment.
- Child and adolescent psychiatric disorders were associated with poorer family function, family psychopathology, and not living with both parents.
- Most children and adolescents in need of mental health services do not receive assistance.
- This study highlights the increasing need to re-evaluate child and adolescent mental health services in Latin America.
- There is a need for additional nationally representative child and adolescent psychiatric mental health surveys in Latin America.

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