ORIGINAL ARTICLE

The *DSM-IV* Rates of Child and Adolescent Disorders in Puerto Rico

Prevalence, Correlates, Service Use, and the Effects of Impairment

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Background: Few prevalence studies in which *DSM-IV* criteria were used in children in representative community samples have been reported. We present prevalence data for the child and adolescent population of Puerto Rico and examine the relation of *DSM-IV* diagnoses to global impairment, demographic correlates, and service use in an island-wide representative sample.

Methods: We sampled 1886 child-caretaker dyads in Puerto Rico by using a multistage sampling design. Children were aged 4 to 17 years. Response rate was 90.1%. Face-to-face interviews of children and their primary caretakers were performed by trained laypersons who administered the Diagnostic Interview Schedule for Children, version IV (DISC-IV) in Spanish. Global impairment was measured by using the Children's Global Assessment Scale scored by the interviewer of the parent. Reports of service use were obtained by using the Service Assessment for Children and Adolescents.

Results: Although 19.8% of the sample met *DSM-IV* criteria without considering impairment, 16.4% of the population had 1 or more of the *DSM-IV* disorders when a measure of impairment specific to each diagnosis was considered. The overall prevalence was further reduced to 6.9% when a measure of global impairment was added to that definition. The most prevalent disorders were attention-deficit/hyperactivity disorder (8.0%) and oppositional defiant disorder (5.5%). Children in urban settings had higher rates than those in rural regions. Older age was related to higher rates of major depression and social phobia, and younger age was related to higher rates of attention-deficit/hyperactivity disorder. Both overall rates and rates of specific *DSM-IV*/DISC-IV disorders were related to service use. Children with impairment without diagnosis were more likely to use school services, whereas children with impairment with diagnosis were more likely to use the specialty mental health sector. Of those with both a diagnosis and global impairment, only half received services from any source.

Conclusions: Because we used the DISC-IV to apply *DSM-IV* criteria, the study yielded prevalence rates that are generally comparable with those found in previous surveys. The inclusion of diagnosis-specific impairment criteria reduced rates slightly. When global impairment criteria were imposed, the rates were reduced by approximately half.

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THE FORMULATION OF EXplicit diagnostic criteria in the *DSM-III*[1] and its revision, *DSM-III-R*,[2] facilitated several large-scale epidemiological studies of mental disorder in the United States on the basis of psychiatric diagnosis.[3-7] Many of the revisions in *DSM-IV*[8] followed from results of epidemiological and clinical studies suggesting that disorders previously thought to develop in adulthood were also evident in childhood and that children and adolescents could experience a wide variety of problems and manifestations of distress that fail to satisfy criteria of a mental disorder.[9,10] These studies also provided new insights into the prevalence and comorbidity of mental disorders, the role of impairment in arriving at meaningful diagnoses, and the discrepancies between rates of need for services and actual service provision. When *DSM-IV* was developed, epidemiological information based on *DSM-III* and *DSM-III-R* study results was critical in fine-tuning the diagnostic criteria and integrating clinical significance in the formulation of the disorders.

Starting with *DSM-III*, all versions of the *DSM* stipulated that to qualify for a psychiatric diagnosis, a disorder must generally meet a "clinical significance" criterion that involves features of impairment or distress. However, in *DSM-IV*, this criterion was made more explicit. The *DSM-IV* includes clinical significance among the essential criteria for most specific disorders, with only the most obvi-

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ous and impairing conditions (eg, schizophrenia and other psychotic disorders) excepted.[11] The implications of these revisions in the *DSM* have only begun to be explored empirically for both adult[12] and childhood[9,13] disorders, although the revisions have generated considerable theoretical debate.[14,15]

The explicit clinical significance requirement has led to the development of epidemiological diagnostic instruments based on the *DSM-IV* that for the first time make clinical significance a prerequisite for each of the disorders measured. When impairment in functioning was not taken into account, a number of epidemiological studies that applied *DSM-III* and *DSM-III-R* criteria[4,5,16] reported prevalence rates higher than 30% for diagnosable mental disorders. Although such high rates were not universal findings, they suggested that the *DSM-III* and *DSM-III-R*, as operationalized in certain structured diagnostic instruments, tended to be overly inclusive.[17-19] It is still not clear the extent to which these findings are caused by characteristics of the taxonomy or to the way in which the taxonomy is operationalized in instruments.

New measurement procedures have been developed to implement the clinical significance and other criteria changes in the *DSM-IV*, and several of the procedures are designed for assessing persons in community samples and/or in primary care settings.[20,21] Although there are still a number of substantial and unresolved issues regarding valid and reliable assessment of psychiatric status and functioning in children and adolescents,[8,10-22] it is important to inform the discussion of these issues by presenting systematic data collected by using the latest measures and the latest diagnostic criteria. Few epidemiological studies of prevalence rates of child psychiatric disorders and their correlates based on *DSM-IV* criteria have been reported.[23]

To add to the pool of data regarding how *DSM-IV* criteria apply to general population samples, we present findings about the prevalence and correlates of child and adolescent disorders defined according to the *DSM-IV* in a representative sample of children aged 4 to 17 years on the island of Puerto Rico who were interviewed between 1999 and 2000. The *DSM-IV* diagnoses were operationally determined by using the Diagnostic Interview Schedule for Children, version IV (DISC-IV).[24] The DISC-IV has added questions to assess the clinical significance (impairment or distress) to the diagnostic schedules of each of the disorders it measures. To illustrate the importance of including clinical significance as 1 of the criteria that defines each psychiatric disorder, we highlight the issue of clinical significance by reporting *DSM-IV* disorders with and without disorder-specific impairment-distress criteria. The issue of impairment is further examined by considering information from a global impairment rating, the Parent Interview–Children's Global Assessment Scale (PIC-GAS).[18]

We considered it important to include both the measure of specific impairment and the global measure for several reasons. First, the assessment of specific impairment, such as that obtained with the DISC-IV, is a subjective rating requiring that the respondent establish a causal connection between the symptoms of a specific diagnosis and resulting impairment or distress. Although these ratings have demonstrated reliability,[25] the accuracy with which parents or children can make the attribution of impairment to the specific symptoms has never been validated and is therefore open to question.[26] We wanted to provide different alternatives for assessing impairment and elected to use the global measure, PIC-GAS, which has demonstrated reliability and validity.[18]

Another consideration for including both measures was that the DISC impairment measures also incorporate an item that relates to distress caused by the symptoms. In attempting to adhere to *DSM-IV* criteria, we considered it important to include the notion of distress, as well as that of impairment. We also wanted to measure need for mental health services by using a definition of need for services that includes meeting criteria for a disorder and substantial impairment in functioning. Because clinical significance is such an important issue, we did not want to rely exclusively on a single measure. Moreover, the rating of global impairment takes into account all aspects of the child's overall functioning, whereas the DISC schedules used in the present study include only a selected group of *DSM-IV* disorders. It is conceivable, for example, that a child with autism or another serious developmental disorder not included in the DISC could have results negative for the DISC diagnoses being considered, as well as for diagnosis-specific impairment on the DISC-IV, and still be substantially impaired in functioning.

Besides reporting last-year prevalence rates of selected *DSM-IV* disorders, with and without clinical significance criteria, we report rates of mental health service use among those with and those without targeted *DSM-IV* diagnoses. The patterns of service use not only provide useful information for policy makers who use prevalence estimates, but they also provide insights into the interpretation of both diagnostic and impairment information.

There are several advantages in studying *DSM-IV*/DISC-IV diagnoses in a representative island-wide sample of the Puerto Rican population. This population includes the full spectrum of socioeconomic status, with children living in different contexts of economic advantage and poverty in both urban and rural areas. The sample obtained for the present study represents the full range of diversity of the child population. These factors enhance the generalizability of the findings. Although Puerto Rico clearly differs from mainland American populations in language, culture, and distribution of risk factors, prevalence studies of both adult and child psychiatric disorder performed in Puerto Rico have shown remarkable similarity to overall trends in the United States.[16,27-30]

Most child psychiatric epidemiological studies have focused on a narrow age range or on specific age groups.[17] Our study includes children from a broad age range of 4 to 17 years. We are able to analyze patterns of association between rates of disorder and sex, parental education, family income, and urban vs rural residence to verify if relations between psychiatric disorder and these demographic factors are similar to those found elsewhere, as well as to findings of an island-wide child study of *DSM-III* disorders performed in 1985.[16]

METHODS

SAMPLE DESCRIPTION AND PARTICIPANTS

An island-wide household probability sample of children aged 4 to 17 years was drawn from 4 strata: Puerto Rico's health reform areas, urban vs rural areas, participant age, and participant sex. Block groups defined in the US Bureau of the Population and Housing 1990 Census for Puerto Rico were the primary sampling units. These groups were classified according to economic level and size, grouped into block clusters, and further classified as urban or rural.

Clusters of households were randomly selected from each stratum, households with children aged 4 to 17 years were selected from the clusters, and 1 child was selected from each household by using Kish tables[31] adjusted for age and sex. From 2102 eligible households, 1886 parent-child dyads were interviewed for a total response rate of 90.1%.

The sample was weighted to represent the general population of children in Puerto Rico in the year 2000. The weights correct for differences in the probability of selection because of the sampling design and adjust for nonresponse. To account for the complex sampling design, SEs were estimated (SUDAAN software release 8.0; Research Triangle Institute, Durham, NC).

Table 1 shows the demographic characteristics of the sample before poststratification. The distribution by age and sex of the sample obtained is similar to that of the Puerto Rican population as described in the 2000 US census. The final sample of 1897 children constituted a sampling fraction of approximately 2.2 per 1000 children in the population.

Table 1. Demographic Distribution of Children in the 2000 US Census and Project Sample

	Sample		Census 2000	
Demographic	No.	Weighted* %	No.	%
Sex				
Male	982	53.1	438 540	51.1
Female	915	46.9	419 202	48.9
Age, y				
4-10	986	52.3	431 004	50.2
11-17	911	47.7	426 738	49.8

*With design weights.

INSTRUMENTS AND MEASURES

The DISC-IV

Last-year *DSM-IV* psychiatric disorders were assessed by using the latest translation into Spanish of the DISC-IV,[25] with parallel youth and parent interview versions. The test-retest reliability of the DISC-IV has been reported in both Spanish-speaking and English-speaking clinic samples and yielded comparable results.[24,25]

The DISC-IV inquires about the level of impairment and distress associated with each diagnosis through probes that determine the degree to which the symptoms of a given diagnosis have caused distress to the child or affected his or her school functioning or relations with caretakers, family, friends, or teachers. The test-retest reliability of the impairment and distress probes were fair to moderate; most κ values ranged from 0.42 to 0.80 for most disorders assessed.[25]

Children younger than 11 years were not interviewed with the DISC because there is evidence that their reports would not be reliable.[32] The substance abuse disorders schedules were administered in children aged 11 to 17 years but not to their parents, whereas oppositional defiant disorder (ODD) was excluded from the child protocol. Parents tend to be unaware of the use of substances in their adolescent children and are not considered good sources of information for substance use disorders in their children. Results of prior studies in which Puerto Rican and mainland samples were included have also shown poor reliability for ODD in child reports, as well as poor concordance with clinical diagnosis.[33]

The official DISC-IV scoring algorithms use data from parent and child informants and allow the ascertainment of the presence of a diagnosis, with or without impairment as measured with the DISC impairment scales. In this article, we use the DISC impairment algorithm that refers to moderate impairment in at least 1 area of functioning. The rates reported include both parent and child informants for children aged 11 to 17 years, and only parent informants for children younger than 11 years. A case is considered positive if it meets full *DSM-IV* diagnostic criteria according to either the parent or child DISC-IV.

The PIC-GAS

Overall global impairment in functioning was measured by using the PIC-GAS. The PIC-GAS is the lay version of the Children's Global Assessment Scale.[18] The concurrent, discriminant, and construct validity of the PIC-GAS have been reported by using combined data from 4 communities, including data from Puerto Rico.[18] Although the PIC-GAS is presented in 10 deciles that describe different levels of functioning, the instructions for assigning scores on the PIC-GAS, as well as on the *DSM-IV* Global Assessment of Functioning Scale, specifically encourage raters to "use intermediary levels." Previous psychometric work with the clinician Children's Global Assessment Scale[34] revealed that a score lower than 65 was the best cutoff to distinguish between those definitely impaired and those not impaired. Similar psychometric work with the PIC-GAS shows that with lay raters, a score lower than 69 is optimal to identify children who are impaired in functioning.[18]

To our knowledge, none of the publications available have shown empirically derived cutoff scores to distinguish those who are mildly, moderately, or severely impaired. Therefore, we have opted to use a cutoff lower than 69 on the PIC-GAS coupled with diagnosis-specific impairment ratings to operationalize the classification of serious emotional disturbance that is considered by the US federal government in reimbursing states for mental health services.[35] This definition requires the presence of a *DSM-IV* diagnosis with substantial impairment in functioning.

Service Assessment for Children and Adolescents

The Spanish-language version of the Service Assessment for Children and Adolescents (SACA)[36] was used to ascertain the types of services and treatments used by children for emotional, alcohol, and drug problems. The instrument inquires about lifetime and last-year use of 25 specific service settings that are divided among inpatient-residential, outpatient, and school settings.[37] The outpatient setting is disaggregated into mental health outpatient and general health outpatient. The mental health outpatient includes patients who attended a mental health or substance abuse clinic or saw a professional in a private office. The Spanish-language SACA has shown fair to moderate reliability, with most κ values ranging from 0.41 to 0.87 for most services reported by parents and children, as well as moderate to substantial sensitivity when parental reports were compared without medical records.[36] The SACA has 2 versions (parent and child), and use of services was considered positive if a positive response was given by either parent or child.

Table 2. Estimates of Last-Year Prevalence Rates of *DSM-IV*/DISC-IV Diagnoses in Puerto Rican Children Aged 4 to 17 Years*

DISC-IV Study Diagnoses	Parent/Child (Aged 4-17 Years) (N = 1897)							
	Partial *DSM-IV*/DISC-IV†		Full *DSM-IV*/DISC-IV‡		Partial *DSM-IV*/DISC-IV§ +PIC-GAS<69		Full *DSM-IV*/DISC-IV‖ +PIC-GAS<69	
	Weighted %	95% CI	Weighted %	95% CI	Weighted %	95% CI	Weighted %	95% CI
Any depressive	4.1	2.9-5.6	3.4	2.4-4.9	2.1	1.3-3.4	1.7	0.92-3.0
Major depression	3.6	2.5-5.1	3.0	2.0-4.5	1.8	1.0-3.0	1.4	0.75-2.8
Dysthymic	0.6	0.30-1.2	0.5	0.23-1.0	0.4	0.16-0.97	0.3	0.10-0.87
Any anxiety	9.5	7.9-11.4	6.9	5.6-8.6	3.5	2.7-4.6	2.9	2.1-4.0
Social phobia	2.8	2.1-3.8	2.5	1.8-3.4	1.5	0.92-2.3	1.5	0.92-2.3
Separation anxiety	5.7	4.6-7.0	3.1	2.3-4.2	2.2	1.6-3.2	1.5	0.89-2.4
Panic	0.7	0.37-1.5	0.5	0.20-1.2	0.2	0.04-0.76	0.1	0.02-0.82
Generalized anxiety	2.4	1.5-3.6	2.2	1.4-3.4	1.2	0.66-2.1	1.0	0.54-2.0
Posttraumatic stress	0.8	0.38-1.6	0.8	0.38-1.6	0.1	0.03-0.49	0.1	0.03-0.49
Any disruptive	12.6	10.7-14.8	11.1	9.4-13.1	5.6	4.4-7.2	5.5	4.2-7.0
Attention-deficit/ hyperactivity disorder	8.9	7.3-10.8	8.0	6.6-9.8	3.8	2.8-5.3	3.7	2.7-5.1
Conduct disorder	2.6	1.8-3.8	2.0	1.4-3.0	1.4	0.81-2.3	1.3	0.73-2.2
Oppositional defiant disorder	6.0	4.8-7.5	5.5	4.3-7.0	3.4	2.5-4.7	3.4	2.5-4.7
Any substance	3.1	1.9-4.9	1.7	0.87-3.2	0.9	0.38-2.0	0.4	0.15-1.2
Alcohol abuse/dependence	2.0	1.1-3.4	0.8	0.35-1.6	0.8	0.35-1.9	0.4	0.15-1.2
Nicotine dependence	1.0	0.49-2.2	0.8	0.32-2.0	0.4	0.14-1.2	0.3	0.08-1.2
Marijuana abuse/dependence	1.2	0.48-2.8	0.7	0.21-2.1	0.3	0.08-1.2	0.2	0.03-1.4
Other substance abuse/dependence	0.2	0.05-0.54	. . .	. . .	0.04	0.01-0.29	. . .	. . .
Any diagnosis	19.8	17.3-22.6	16.4	14.1-19.0	7.6	6.2-9.2	6.9	5.6-8.4

Abbreviations: CI, confidence interval; DISC-IV, Diagnostic Interview Schedule for Children, version IV; PIC-GAS, Parent Interview–Children's Global Assessment Scale.

*Percentages are based on cases with valid values. Ellipses indicate there were not enough cases.

†Refers to meeting DISC criteria in either parent or child reports, excluding the DISC impairment criterion.

‡Refers to meeting DISC criteria including the DISC-specific impairment criterion in either parent or child reports.

§Refers to meeting DISC criteria including significant impairment based on a cutoff less than 69 on the PIC-GAS.

‖Refers to meeting full DISC criteria including the DISC-specific impairment criterion in either parent or child reports and a cutoff less than 69 on the PIC-GAS.

PROCEDURES

The survey was performed from January 1999 through December 2000. The child's biological mother was the adult informant in 89.4% of the cases. Interviews took place in the subject's home, with different interviewers for parent and child, and interviewers were blinded to the results of each other's interviews. Interviews were audio taped, and 15% were spot-checked for quality control.

RESULTS

PREVALENCE RATES WITH AND WITHOUT IMPAIRMENT

Table 2 presents the last-year prevalence rates of specific *DSM-IV*/DISC-IV disorders for children aged 4 to 17 years. Prevalence is reported in 4 ways. The first column shows the presence of DISC diagnostic criteria in either parent or child report, without taking clinical significance (impairment and distress resulting from symptoms) into account. The rates reported in the second column qualify the column 1 diagnoses by requiring at least 1 level of DISC-IV impairment or distress according to either parent or child. Therefore, the values in the second column refer to disorders that meet full *DSM-IV* criteria. The third column presents rates based on the presence of criteria for diagnosis in either parent or child without the DISC impairment criteria but with global impairment as measured with the PIC-GAS with a score lower than 69. The rates appearing in the fourth column require the presence of DISC-IV criteria for diagnosis according to either parent or child, with DISC-IV impairment and a global impairment score lower than 69 on the PIC-GAS.

The proportion of the sample that appeared to have met all *DSM-IV* criteria except for the impairment criterion is 19.8% (first column of Table 2). Prevalence rates are all greater without impairment than when impairment is considered. The second column is a more faithful representation of *DSM-IV* criteria, in that it requires both diagnosis and some degree of specific impairment or distress to be present. When all diagnoses assessed with some impairment are considered (second column), 16.4% of the sample has 1 or more *DSM-IV* diagnoses. The specific diagnosis with the highest prevalence is attention-deficit/hyperactivity disorder (ADHD) (8.0%), followed by ODD (5.5%), separation anxiety (3.1%), and major depression (3.0%).

In contrast, the third column shows the prevalence rates when global impairment (PIC-GAS score lower than 69) is substituted for the DISC-IV disorder-specific impairment criteria. The rates in this column are not consistent with the full *DSM-IV* criteria, in that they take into account clinical significance of mental disorder as measured with global impairment instead of impairment due to specific symptoms. The rate for any di-

Table 3. Demographic Correlates of *DSM-IV*/DISC-IV Diagnoses in Puerto Rico, Parent/Child (Aged 4-17 Years) Combined Report*

Demographics†	Any Diagnosis‡ (n = 307)	Any Depressive (n = 49)	Any Anxiety (n = 126)	Any Disruptive (n = 211)	Social Phobia (n = 43)	Separation Anxiety (n = 67)	ADHD (n = 152)	CD (n = 35)	ODD (n = 105)	MDD (n = 41)
Child										
Sex										
Male	1.1 (0.82-1.6)	0.3 (0.17-0.62)§	0.8 (0.51-1.4)	1.6 (1.0-2.3)§	1.1 (0.53-2.3)	0.9 (0.49-1.7)	2.0 (1.2-3.4)§	1.1 (0.46-2.4)	1.6 (1.02-2.7)§	0.4 (0.17-0.71)§
Female										
Age per 10 y	1.4 (0.96-2.2)	5.2 (1.9-14.1)§	1.7 (1.1-2.7)§	0.9 (0.56-1.4)	2.4 (1.1-5.4)§	0.8 (0.43-1.7)	0.5 (0.31-0.93)§	1.5 (0.56-4.3)	0.7 (0.41-1.2)	4.6 (1.6-13.2)§
Adult										
Education										
Less than high school	1.0 (0.72-1.5)	1.1 (0.46-2.5)	1.0 (0.54-2.0)	1.0 (0.66-1.5)	1.1 (0.47-2.7)	1.2 (0.58-2.5)	1.1 (0.63-2.0)	1.1 (0.38-3.0)	0.8 (0.49-1.4)	1.0 (0.40-2.5)
High school										
Some university	1.0 (0.70-1.5)	1.1 (0.46-2.8)	0.9 (0.55-1.6)	0.9 (0.60-1.5)	0.9 (0.38-2.2)	1.1 (0.49-2.3)	0.9 (0.52-1.5)	1.2 (0.44-3.4)	0.6 (0.31-1.1)	1.2 (0.45-3.2)
Civil status										
Married										
Not married	1.4 (1.1-1.9)§	2.0 (0.99-4.1)	1.3 (0.84-2.0)	1.3 (0.93-1.9)	1.0 (0.51-2.0)	1.2 (0.62-2.2)	1.3 (0.88-2.0)	1.8 (0.77-4.4)	1.4 (0.81-2.4)	2.4 (1.1-5.4)§
Household income $										
<12 000										
12 001-25 000	1.0 (0.63-1.4)	0.9 (0.38-2.0)	0.7 (0.39-1.2)	1.2 (0.75-1.9)	0.7 (0.32-1.5)	1.1 (0.53-2.4)	1.4 (0.80-2.6)	0.8 (0.36-2.0)	0.9 (0.54-1.5)	0.7 (0.29-1.9)
≥25 001	0.8 (0.50-1.1)	0.6 (0.27-1.5)	0.6 (0.39-1.1)	0.9 (0.57-1.5)	0.7 (0.28-1.8)	0.9 (0.40-2.2)	0.9 (0.45-1.7)	0.6 (0.21-2.0)	0.9 (0.53-1.6)	0.7 (0.29-1.7)
Residence										
Rural										
Urban	1.9 (1.2-3.0)§	1.4 (0.58-3.5)	1.9 (0.99-3.6)	1.9 (1.1-3.3)§	1.4 (0.68-2.8)	1.9 (0.79-4.7)	2.1 (1.0-4.0)§	1.4 (0.58-3.5)	1.4 (0.79-2.7)	1.5 (0.54-4.3)

Abbreviations: ADHD, attention-deficit/hyperactivity disorder; CD, conduct disorder; DISC-IV, Diagnostic Interview Schedule for Children, version IV; MDD, major depressive disorder; ODD, oppositional defiance disorder.

*Refers to meeting full DISC-IV criteria including DISC-specific impairment criterion in either parent or child reports. All values presented as odds ratio (95% confidence interval).

†Reference level in italics.

‡Also includes substance abuse disorders, posttraumatic stress disorders, panic, generalized anxiety disorder, and dysthymia not presented herein because of lower than 2% prevalence rates.

§$P \leq .05$.

agnosis is reduced from 16.4% to 7.6% (third column). For both overall prevalence and the diagnostic groupings, the effect of the global impairment qualification, as compared with the standard *DSM-IV*/DISC-IV definition that includes the DISC impairment scales, tends to reduce the prevalence rate much more (about half). In the fourth column, both global impairment and the DISC-IV disorder-specific impairment criteria are included in the designation of a case, and the rate is reduced slightly from 7.6% to 6.9%.

DEMOGRAPHIC CORRELATES

Prior to the development of the *DSM-IV*, a number of demographic factors were shown to relate to child psychiatric disorder.[30,38,39] To determine which of these correlates of the diagnoses remain after the application of *DSM-IV*/DISC-IV criteria, we report in **Table 3** associations of the more prevalent disorders with age, sex, parental education, household income, parental civil status, and urban vs rural residence. Odds ratios (ORs) were estimated by using logistic regression models that weighted the data for the sample design poststratified to the 2000 census results (SUDAAN).

Boys had more disruptive disorders (OR=1.6), ADHD (OR=2.0), and ODD (OR=1.6), while girls had more depressive disorders in general (OR=0.3) and specifically major depression (OR=0.4). Age had a mixed pattern of associations with these childhood disorders. Rates tended to increase with age for depressive disorders (OR=5.2), anxiety disorders (OR=1.7), social phobia (OR=2.4), and major depression (OR=4.6). Rates tended to decrease with age for ADHD (OR=0.5), and there was no reliable age association with any disruptive disorder, specifically conduct disorder and ODD, or with separation anxiety disorder. Neither parental education nor income was related to any of the disorders assessed. Children whose parents were not married (single, separated, widowed, or divorced) were more likely to meet criteria for any studied DISC-IV disorder and major depressive disorder. In addition, children who lived in urban areas were more likely to meet criteria for any diagnosis (OR=1.9), any disruptive disorder (OR=1.9), and ADHD (OR=2.1).

Table 4. Rates of Last-Year Mental Health Service Use According to Parent and Child Combined Data in Puerto Rican Children Aged 4 to 17 Years With and Without Impairment*

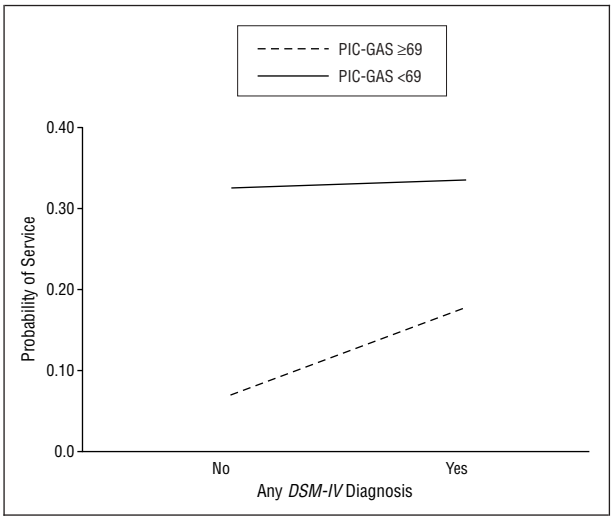
Mental Health Services	No *DSM-IV*/DISC-IV† and No Global Impairment PIC-GAS≥69 (n = 1450)	*DSM-IV*/DISC-IV and No Global Impairment PIC-GAS≥69 (n = 181)	No *DSM-IV*/DISC-IV and Global Impairment PIC-GAS<69 (n = 125)	*DSM-IV*/DISC-IV and Global Impairment PIC-GAS<69 (n = 123)	*P* Value‡
Any use	9.7 (1.1)	25.7 (4.2)	39.5 (6.0)	49.6 (6.2)	≤.001
Any school service	6.8 (0.9)	17.6 (3.9)	32.2 (5.6)	33.3 (5.6)	≤.001
Any outpatient service	4.4 (0.7)	12.2 (2.8)	17.2 (4.4)	35.3 (5.8)	≤.001
Any mental health outpatient	4.1 (0.6)	11.4 (2.8)	12.4 (3.4)	33.7 (5.8)	≤.001
Any mental health professional	3.7 (0.6)	11.2 (2.8)	9.7 (2.8)	24.4 (5.2)	≤.001
Any general health care sector	0.4 (0.2)	1.3 (0.7)	4.0 (2.6)	5.8 (2.2)	≤.05

Abbreviations: DISC-IV, Diagnostic Interview Schedule for Children, version IV; PIC-GAS, Parent Interview–Children's Global Assessment Scale.
*Values are presented as weighted percentage (standard error).
†Refers to meeting full DISC criteria including DISC-specific impairment criterion in either parent or child reports.
‡χ^2 Test for general association. Frequencies based on valid cases for both variables. Because of missing information, frequencies vary slightly for each variable.

Table 5. Conditional Odds Ratios of Reporting Last-Year Mental Health Service Use Given Diagnosis and/or Impairment

	DSM-IV/DISC-IV* Diagnosis		PIC-GAS<69	
Mental Health Services	Odds Ratio†	*P* Value	Odds Ratio†	*P* Value
Any use	2.4 (1.5-3.9)	≤.001	4.4 (2.9-6.6)	≤.001
Any school service	1.8‡ (1.1-2.8)	≤.05	3.9‡ (2.5-6.0)	≤.001
Any outpatient service	2.8 (1.7-4.7)	≤.001	4.2 (2.5-7.0)	≤.001
Any mental health outpatient	3.2 (2.0-5.1)	≤.001	3.6 (2.2-5.8)	≤.001
Any mental health professional	3.2 (1.9-5.3)	≤.001	2.7 (1.6-4.5)	≤.001

Abbreviations: DISC-IV, Diagnostic Interview Schedule for Children, version IV; PIC-GAS, Parent Interview–Children's Global Assessment Scale.
*This includes meeting full DISC criteria including DISC-specific impairment criterion in either parent or child reports.
†Data in parentheses are the 95% confidence interval.
‡Interaction term (diagnosis × impairment) was significant at $P \leq .05$. Odds that are shown for each variable are averaged across levels of the other variable.



Probability of school service as a function of diagnosis and impairment. PIC-GAS indicates Parent Interview–Children's Global Assessment Scale.

MENTAL HEALTH SERVICE USE

In **Table 4**, we show last-year service use rates for groups of children cross classified according to whether they had 1 or more *DSM-IV*/DISC-IV diagnosis and whether they had global impairment scores lower than 69. As expected, children with *DSM-IV* diagnoses and impairment used the most services, but only half of the children (49.6%) in this group received any type of service. Overall, school services were more frequently used than any other service and were used by children who were impaired regardless of whether they met *DSM-IV*/DISC-IV criteria.

To further assess the relative power of *DSM-IV*/DISC-IV and global impairment (PIC-GAS score lower than 69) to predict service use, we performed a series of logistic regression analyses. The results (**Table 5**) showed that for all service categories except for any school service, use could be described in terms of main effects of both diagnosis (present/absent) and global impairment (present/absent). The DISC diagnosis and global impairment were both strongly associated with all types of service use, but the effects of global impairment were generally stronger than the effects of diagnosis, with the exception of use of the specialty mental health sector (any mental health professional), for which diagnosis had a larger OR than did global impairment.

For any school service, the interaction term was significant. As shown in the **Figure**, about one third of children who had PIC-GAS scores lower than 69 received school services, regardless of the presence of a diagnosis. Among those with no impairment and no diagnosis, school services were used by 6.8%, and use increased to 17.6% among those with a diagnosis.

COMMENT

Our results are generally consistent with previous *DSM-III* prevalence rates reported for the island,[16] despite changes in the nosology and the new version of the DISC that was used. In both the survey performed in 1985 and the current study, the relative frequency with which the disorders occurred was similar, even though the prevalence rates of the specific disorders were somewhat different. In both surveys, ADHD and ODD were approximately twice as common as were major depression, separation anxiety, social phobia, generalized anxiety, and conduct disorder.

Nevertheless, we identified differences in prevalence rates across these studies that cannot be attributed solely to the application of a clinical significance criterion such as was used in our present data set. These differences in prevalence rates are likely to be influenced by differences in the methods used in the surveys. The 1985 *DSM-III* survey inquired about 6-month prevalence rates rather than the year rates of the current survey. It also combined information from child and parent informants in all ages, whereas information from both informants in the present survey was combined only in the children aged 11 to 17 years. Furthermore, the 1985 rates were based on clinical judgment by clinicians who used a prior version of the DISC to structure the interview, whereas in this study diagnoses were estimated with a structured diagnostic interview used by lay interviewers.

The *DSM-IV*/DISC-IV prevalence rates we report are not fully consistent with those from a recently reported *DSM-IV* study performed among black and white youth in North Carolina. In that study, Angold et al[23] reported lower rates of ADHD, ODD, and major depression than those obtained in the present study, but they found higher rates of conduct disorder and substance use. Several factors may help explain these differences. The lower rates could be explained by the fact that the Angold et al[23] survey used an interviewer-based structured interview[19] different from the one we used. Moreover, they reported a 3-month prevalence rate rather than a 1-year prevalence rate, and the children assessed were aged 9 to 17 years and living in rural areas. Their study also included a wider range of psychiatric disorders than does the present study. Nevertheless, Angold and colleagues[23] performed further analyses of their data with the same diagnoses evaluated in the present study (oral communication, November 2002) and found rates of any *DSM-IV* disorder of 17.7% (95% confidence interval, 15%-20%) that are similar to the rate in this study of 17.3% (95% confidence interval, 14.5%-20.7%), when we excluded children aged 4 to 8 years from our rates to make the analyses comparable.

Previous reports of rates of specific diagnoses based on earlier versions of the *DSM* and in which the same assessment instruments were used have shown few differences in rates between Puerto Rico and mainland localities, with 1 salient exception. The rates of conduct disorder in both our 1985 survey[40] and in the Methods for the Epidemiology of Child and Adolescent Mental Disorders study[26] have been compared with those obtained in mainland populations and were lower among island Puerto Rican children and adolescents. Lower rates of substance use disorders in both adult and adolescent populations have also been reported for island Puerto Ricans, as compared with findings in mainland populations.[41,42] The lower rates appear to be related to the extent to which correlates of these disorders appear on the island, the most salient being better family relations and social support.[26]

Similar to results of other surveys,[16,43,44] our study results showed many of the expected associations of ADHD, ODD, anxiety disorders, and depressive disorders with age and sex.[10,43,45] Unlike results of many studies of mental disorder among children and adolescents,[46-48] including the earlier study[16] in Puerto Rico, we found no associations between rates of disorder and indicators of socioeconomic status, such as parents' education and family income. This unexpected finding led to further exploration. In one analysis, we constructed levels of income with 3 categories used by Costello et al[46] to define relative poverty: lowest third, middle third, and upper third. In another analysis, we combined parental income and education to define a familial high-risk group that was low in both income and education. Neither of these additional analyses revealed an association. However, our failure to find that prevalence varies with traditional measures of socioeconomic factors is consistent with results of a handful of studies that focused on impoverished families.[23,49]

Beyond absolute and relative measures of poverty, we considered perceptions of what constitutes poverty. Forty-eight percent of Puerto Ricans live below the poverty level.[50] Our survey showed that only 22.2% of parents with an annual income below $12 000 considered that they lived poorly or very poorly, while 42.8% of those thought they lived well or very well. Of parents in the $12 001 to $25 000 income level, 13.2% thought they lived poorly. When perception of poverty was substituted for actual income, we found that disruptive disorders (ADHD and ODD) were more frequent among those who reported that they lived poorly. Perception of poverty was not related to either anxiety or depressive disorders. This pattern is consistent with results in other studies[51,52] that reported stronger associations between poverty and externalizing disorders than with internalizing disorders. The findings suggest that absolute or relative poverty indexes may not be the most appropriate measures to use in populations where most persons are of low income. Further development of measures of perceived poverty or the inclusion of measures of "social capital,"[53] such as the existence of job opportunities, community organization, and other community resources, may be more fruitful.

We found that global impairment as indicated by a PIC-GAS score lower than 69 was an important predictor of service use, even when adjusting for the presence of a *DSM-IV*/DISC-IV disorder. Except for mental health specialty services, global impairment appeared to be as important, if not more important, than diagnosis in predicting service. For school service use, presence of a diagnosis was important only for children with PIC-GAS scores of 69 or higher. Service use among children with global impairment was the same for those with a diagnosis as for those without a diagnosis as measured in our survey. It is possible that some of the children receiving

school services had disorders, such as learning, motor skills, and language disorders, that were not assessed in our study. Such disorders could have been perceived by counselors and teachers and therefore could have been addressed in school. Children with impairment without diagnosis may not have been eligible for specialty mental health treatment because they did not meet the eligibility criteria of severe emotional disturbance established by most states and insurance companies in both the mainland United States and Puerto Rico (ie, meeting criteria for *DSM-IV* disorder and substantial impairment).[35]

The importance of impairment in our study is not simply a function of our use of logistic regression. Alegría et al[54] found that impairment was the most important predictor of service use when parent decisions to seek service were modeled by using classification and regression tree approaches.[55] Given that 13.3% of the children in Puerto Rico were impaired (data not shown) and that this seems to be such an important predictor of service use, an important strategy for prevention interventions and policy makers should be the identification of children with impairment and intervening with parents and educators so that they can link impairment with the need for mental health service.

As was shown in other research,[7,44] our data showed that the inclusion of the *DSM-IV* clinical significance criterion with the diagnostic criteria of most Axis I diagnoses reduced the prevalence rates of disorders. The use of specific impairment items reduced by 18% the prevalence from that obtained through criteria without impairment and distress. Rates were reduced by an additional 58% when a global impairment measure was included. Several investigators[5,7,56] noted that prevalence rates vary according to the impairment measure used. These findings suggest the need for a consensus about how clinical significance is conceptualized, operationalized, and measured for both research and clinical purposes. Although progress has been made in the conceptualization of impairment by the World Health Organization in its *International Classification of Functioning, Disability and Health*,[57] further work is needed to examine the applicability of this classification to children. Some of the discrepancies observed in prevalence rates among studies might be the result of such a lack of consensus; it may also contribute to the low level of concordance frequently observed among clinicians on clinical diagnostic assessments.

The reduction in prevalence rates observed when the criterion of impairment and distress is introduced to the diagnostic criteria does not necessarily challenge the validity of the *DSM-IV*. Some have argued that the inclusion of this criterion in most *DSM-IV* (Axis I) diagnoses is unnecessary[11] because many disorders already include in their symptom criteria impairment in functioning. Nevertheless, the *DSM-IV* criteria, as implemented in epidemiological interview measures that incorporate impairment and distress, such as the DISC-IV, led to prevalence rates in Puerto Rico that serve as reasonable working hypotheses about the burden of mental disorders among children and adolescents. The information provided by trained lay interviewers in a single assessment session can only begin to approximate a full professional assessment that uses behavioral observations, multiple informants, and, where available, biological tests.

Economical methods to assess mental health and impairment due to mental disorders, such as those used in field surveys, provide the opportunity to determine the commonness of the signs and symptoms of disorders that are proposed because of the nosology and to plan longitudinal studies of onset, course, and treatment of mental disorders. Perhaps more strikingly, these assessments are important tools for planning mental health services and for assessing children with serious emotional disturbance in the educational system. Although the inclusion of specific clinical severity criteria in *DSM-IV* reduces prevalence estimates, these lower rates do not automatically translate into lower service needs. Results of a comprehensive assessment of both diagnosable psychiatric disorder and global impairment suggest that services are needed for an important group of children who are below the threshold needed for a diagnosis but are nonetheless globally impaired. These findings, if replicated, have important implications for future revisions of the *DSM-IV*.

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