

RESEARCH PAPERS

Depression and Anxiety in Parents and Children: A Direct Interview Study

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Abstract — This study examined the specificity of transmission of major depression and anxiety disorders between parents and children based on 214 children ages 6–23 years from 89 families. All parents were evaluated by direct interview with the child using the SADS-L. The children were independently evaluated by direct interview with the child and with the parent about the child using the K-SADS-E. Diagnoses were made by psychiatrists blind to the parents' clinical status, and were based on all data from informants. Results showed that children of parents with major depression with and without panic disorder are more impaired, receive more psychiatric treatment, and have more psychiatric diagnoses than children of parents with other psychi-

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atric disorders or no psychiatric disorders. These results cannot be explained by differences in IQ, school problems, age and sex of the child, or number of diagnoses. There is a suggestion of specificity of transmission of comorbid disorder, as the children of parents with major depression and panic disorder were at the greatest risk for both major depression and an anxiety disorder. Discussions focus on the implications of these findings and suggestions for future research.

INTRODUCTION

In a previous report we showed that the children (6-17 years of age) of probands with primary major depression and anxiety disorders, as compared with the children of probands with major depression only or to the children of a matched normal control group, were at increased risk for both depression and anxiety disorder (Weissman et al., 1984). More specifically, we found that major depression in the proband increased the risk of major depression in the children. Major depression plus panic disorder and/or agoraphobia in the proband placed an additional risk of major depression and an anxiety disorder in the children. Lastly, there was a trend for increased risk of separation anxiety in the children of parents with major depression and panic disorder. Although the overall lifetime rates of separation anxiety were quite high in these children (37%), these results did not reach significance, possibly because of the small sample size. The children in this previous study, however, were not interviewed directly. Rather, information on the children was obtained by family history from the proband, spouse, and other first-degree relatives. Moreover, this study did not take into account the diagnoses of both parents.

Although there are few studies that directly assess the children of anxiety patients (Crowe, Noyes, Pauls, & Slyman, 1983; Turner, Beidel, & Costello, 1987), retrospective studies and studies of referred children and nonreferred populations demonstrate increasing evidence for a familial factor in the anxiety disorders (Casat, 1988; Last et al., 1987b). In one study of anxiety patients, Turner et al. (1987) found children of anxiety patients to be more anxious and fearful, to report more school difficulties, more somatic complaints, and to be twice as likely to have an anxiety disorder as children of dysthymics, and seven times as likely as children of normal parents. Although the difference in rates of anxiety disorder between children of dysthymics and children of anxiety patients was not significant, possibly because of small sample size, the results suggested the presence of some familial factor in the transmission of anxiety disorders.

Comorbidity between an anxiety and a depression disorder is frequent in both children and adults. Whether these two disorders are distinct from each other, whether the combination represents a specific group, and how they are transmitted is still unclear. There is increasing evidence that having parents with such a comorbidity may be a risk factor for comorbidity in the child (Breier, Charney, & Heninger, 1985; Last, Strauss, & Francis, 1987d; Leckman et al., 1985).

Several studies have looked at the association between these two disorders in children. Kovacs et al. (1989) found that among the childhood MDD cases with comorbid anxiety disorder, the anxiety disorder preceded the depression

about two thirds of the time and often persisted after the depression remitted. In addition, they found that concurrent maternal psychopathology and poor physical health increased the risk of having an anxiety disorder in addition to depression in the children (Kovacs et al., 1989). Specifically, Last et al. (1987a) found an increased rate of maternal affective disorder in children with separation anxiety, and approximately one-third of those children had comorbid major depression.

There is increasing evidence that mothers of children with anxiety disorders manifest similar disorders as their children during their lifetimes, suggesting a continuum from childhood to adult disorders and familial transmission (Last, Phillips & Staffeld, 1987c; Last & Strauss, 1989). Several studies, based on retrospective accounts by mothers, found a high prevalence of mothers of children with overanxious disorder who had a history themselves of overanxious disorder (Last et al., 1987c). Gittleman-Klein (1975) found an increased prevalence of separation anxiety in the parents of school phobic children. In these studies, it is still not clear whether the relationship between parent and child disorders is due to shared genetic or shared environmental risk factors.

This paper reports data on the psychopathology in 214 of the original 220 offspring (Weissman et al., 1984) 6 to 23 years of age of parents with primary major depression with and without panic disorder, as well as the offspring of parents with other psychiatric disorders and no psychiatric disorders. The purpose of this paper is to replicate the earlier findings of the family history study and to address the issue of the specificity of transmission of these disorders between parents and children in a direct interview study.

METHOD

Sample

For a complete description of study design and assessment, see Weissman et al. (1987). The original study includes 220 children at high and low risk for major depression by virtue of the presence or absence of major depression in their parents. There are 65 families in which one or more parents had major depression and 26 families in which neither parent had depression. Two of the families that included six children were dropped from these analyses because either the mother or the father had panic without major depression. The resulting sample consists of 89 families with 214 children. Parents were participants in a family study of major depression (Weissman et al., 1984) who had children between the ages of 6 and 23. Six years elapsed between the time of the initial family study of the adults and the study of children. When the initial family-genetic study of parents began, these children were 1 to 17 years of age. The parents' clinical status was reassessed when the children were interviewed six years later.

Assessment of Parent

Major depression in parents was defined according to the Research Diagnostic Criteria (modified to require four weeks' duration of symptoms

and impairment in a major social role) (Spitzer, Endicott, & Robins, 1978), and was assessed using the Schedule for Affective Disorders — Lifetime Version (SADS-L) (Endicott & Spitzer, 1978). The parents comprising the nondepressed group, originally identified in a 1975 community survey, reported no history of psychiatric illness in at least five direct interviews (the last two using SADS-L) given over an eight-year period.

To determine the presence of a differential risk in relatives because of an accompanying panic disorder in either parent, the depressed parents were grouped according to the presence or absence of panic disorder. Those depressed parents who had a concomitant panic disorder were grouped into the "major depression with panic disorder" group. In 33 of the families, the mother and/or the father had major depression and panic disorder, in 32 families the mother and/or the father had major depression without panic, and in 24 families neither the mother nor the father had major depression or panic. Thirty of the families with major depression with panic disorder had only one parent who met criteria, and in the remaining three families both the mother and father had major depression with panic disorder. In 22 of the 32 families with major depression without panic disorder, only one parent had major depression; and in the other 10 families both the mother and the father had major depression. In addition, there were 16 families in which parents had other psychiatric disorders besides major depression and panic disorder. The parents in these families had such diagnoses as cyclothymia or alcohol abuse. There were also eight families in which parents had no disorder.

Assessment of Children

A slightly modified version of the *Schedule for Affective Disorders and Schizophrenia for School-Aged Children, Epidemiologic Version (K-SADS-E)* (Orvaschel et al., 1982) formed the core of a comprehensive interview administered to the parents about the child and to the child about him or herself. Interviewers who were blind to the parents' diagnoses interviewed a parent (usually the mother) about the child, and at a later time interviewed the child alone. The battery of measures included an assessment of each child's IQ (Dunn & Dunn, 1981) and level of impairment in functioning (C-GAS) (Shaffer et al., 1983), as well as questions about each child's self-esteem (Coopersmith, 1967), school performance, and attendance in special classes including remedial reading, mathematics, or discipline problem classes. The Children's Global Assessment Scale (C-GAS) was developed to allow a rater to synthesize knowledge about the functioning of children and to condense the information into a single clinically meaningful index of severity of disturbance. Scores range in value from 1–100, with the highest score indicating the best functioning of the child. The development of the C-GAS, its utility, and its psychometric properties have been described (Bird et al., 1987; Shaffer et al., 1983). Parents (mothers and fathers) and children over seven years of age were asked to complete self-administered reports about themselves which included Coopersmith's Self-Esteem questionnaire. The Coopersmith Self-Esteem Inventory measures the individual's personal judgment of his or her own worthiness (Coopersmith, 1967). The scale ranges from 1–100 for the

child, with the highest score indicating more self-esteem (see Coopersmith, 1967 for details).

DSM-III diagnoses in children were made according to a "best estimate" procedure (Leckman et al., 1982), in which a child psychiatrist and psychologist who were not involved in the interviewing and were blind to the parents' diagnoses reviewed all sources of information and independently assigned a lifetime DSM-III diagnosis. Discrepancies in diagnoses between the independent evaluators were resolved by a third source, who also independently and blindly reviewed all available information.

In order to assess the reliability of the best estimate procedure, a second child psychiatrist independently and blindly reviewed all available information on 38 randomly selected children and made best estimate diagnoses. Agreement between psychiatrists on children's diagnoses (as measured by the kappa coefficients) was excellent for major depression (.89), conduct disorder (.93), and any diagnosis (1.00), and good for anxiety disorder (.69).

Data Analysis

Chi-square analyses were used to test the associations between parent diagnostic group, age, and sex of the children. The associations between parent diagnoses and religion, social class, children's psychiatric diagnoses, children's rates of psychiatric treatment, and attendance in special classes were also tested using chi-square analysis. Analysis of variance was used to compare parents' ages, children's self-esteem scores, and children's best estimate C-GAS scores. *T*-tests were used to compare children's mean IQ scores (PPVT).

A logistic regression was used to examine the effects of major depression and panic disorder in the parents on rates of major depression and anxiety in the children. Adjusted odds ratios with 95% confidence intervals were derived from the logistic regression after the application of procedures outlined by Mantel and Haenszel (1959). The ratios indicate the strength of the association between parental diagnostic group and the child's diagnosis, while controlling for age and sex of child. It is standard practice to control for age and sex in the logistic regression even if they do not differ between groups, because they are a priori known confounders in observational studies. The statistical significance of the adjusted odds ratio can be judged from the confidence interval and whether or not the interval includes 1.0.

RESULTS

Age and Sex of the Children

The sample consists of 214 children. There are 79 children from 33 families in which either (one or both) parent has major depression with panic disorder, 74 children from 32 families in which either parent had major depression without panic disorder, 41 children from 16 families in which parents had other psychiatric disorders, and 20 children from 8 families in which neither parent had a disorder. There were 101 (47%) boys and 113 (53%) girls, 34

sured by the PPVT (Table 1). However, the children of parents with major depression with or without panic disorder received significantly more treatment for psychiatric problems and were more impaired (lower C-GAS score) than children of parents with other diagnoses or no diagnoses. In addition, the children of parents with major depression and panic disorder had significantly lower C-GAS scores than children of parents with major depression without panic disorder, though it is not considered a clinically significant difference.

DSM-III Diagnoses in Children

The children did not differ overall by parental diagnoses in mean number of diagnoses or for the specific types of anxiety disorder (Table 2). Children of parents having major depression with panic disorder did have a significantly

TABLE 2
LIFETIME RATES/100 OF PSYCHIATRIC DIAGNOSES IN CHILDREN BY PARENTAL DIAGNOSIS

Diagnosis in children	Parent diagnoses				Overall	P Values		
	Major depression		Other disorders(3)	No disorder		1v2	1v3	2v3
	with panic(1)	without panic(2)						
N of children	79	74	41	20				
Mean number of diagnoses	Mean(SE) 2.1 (1.5)	Mean(SE) 1.9(0.3)	Mean(SE) 1.2 (0.3)	Mean(SE) 1.6 (0.3)	NS	NS	.03	.06
	N (%)	N (%)	N (%)	N (%)				
MDD ^a	32.0(40.5)	22.0(29.7)	9.0(21.9)	5.0(25.0)	NS	NS	.04	NS
MDD ^b	25.0(31.7)	18.0(24.3)	7.0(17.1)	1.0 (5.0)	.06	NS	.09	NS
MDD without anxiety	11.0(13.9)	10.0(13.5)	6.0(14.6)	4.0(20.0)	NS	NS	NS	NS
Any anxiety ^c	36.0(45.6)	25.0(33.8)	7.0(17.1)	4.0(20.0)	.008	NS	.002	.06
Panic only	3.0 (3.8)	3.0(4.0)	0 (0.0)	0 (0.0)	NS	NS	NS	NS
Panic and/or agoraphobia	4.0 (5.1)	4.0(5.4)	0 (0.0)	0 (0.0)	NS	NS	NS	NS
Separation anxiety	16.0(20.2)	13.0(17.6)	5.0(12.2)	2.0(10.0)	NS	NS	NS	NS
Anxiety without MDD	15.0(18.9)	13.0(17.5)	4.0 (9.7)	3.0(15.0)	NS	NS	NS	NS
MDD and anxiety	21.0(26.6)	12.0(16.2)	3.0 (7.3)	1.0 (5.0)	.02	NS	.01	NS
Any diagnosis	66.0(83.5)	50.0(67.6)	25.0(61.0)	10.0(50.0)	.006	.02	.006	NS

^aMDD in children according to DSM-III criteria (not excluding other diagnoses).

^bMDD in children used same modified DSM-III criteria as in parents' diagnoses (4 week duration, impairment in social role). Not excluding other diagnoses.

^cThe diagnosis of any anxiety disorder includes the following diagnoses: panic disorder, agoraphobia, separation anxiety, obsessive compulsive disorder, overanxious disorder, and/or simple and social phobias.

greater mean number of diagnoses than children of parents with other psychiatric diagnoses. The lack of significance for the specific anxiety disorders possibly was due to the small sample size. However, there were overall differences in the children by the four parental diagnoses for major depression according to strict criteria ($p < .06$), any anxiety disorder ($p < .008$), major depression and any anxiety disorder ($p < .02$), and any diagnosis ($p < .006$). More interestingly, there was a gradient in rates of comorbid depression and anxiety in children based on parental diagnosis: The highest rates were found in children of parents with both major depression and panic disorder, followed by children of parents with only major depression, then by children of parents with other psychiatric disorders, with the lowest rates reported in the children of normal parents. This gradient was reflected in the pairwise comparisons; the differences in rates of disorder between children of parents with major depression and panic when compared to children of parents with other disorders were significant for major depression (DSM-III criteria), any anxiety disorder, major depression and anxiety, and any diagnosis. There was a non-significant trend for higher rates of major depression (strict criteria) in children of parents with major depression with panic compared to children of parents with other psychiatric disorders. There was no significant difference in rates of MDD without anxiety (DSM-III criteria) and anxiety (without depression) across the parent diagnostic groups. The comparison of rates of disorder in children of parents having major depression with panic disorder to children of parents having major depression without panic disorder showed no significant differences for any disorder, except for rates of any psychiatric diagnosis. There was a significantly higher rate of any diagnosis in the children of parents having major depression with panic disorder compared to the children of parents having major depression without panic.

Although not shown in the table, the authors stratified the study sample by age to examine the rates of separation anxiety in children 6 to 17 years of age to make it comparable to the family history study. The rate of separation anxiety in children of parents with major depression and panic increased from 20.2% in children age 6–23 years to 29.6% in children ages 6–17 years. Although there were higher rates of separation anxiety for children ages 6–17 years having parents with major depression and panic disorder (29.6%), the rate did not significantly differ from the rate in children of parents with major depression only (23.3%).

Depression and Anxiety Disorders in the Children

Table 3 shows the adjusted odds ratios for major depression, anxiety disorder, and both disorders in the children, controlling for age and sex of the child in the logistic regression. The results more clearly show the gradient suggested by the pairwise comparisons. Although the odds ratios are not significant, the trend suggests that there is an increased risk for any anxiety disorder (OR 1.39) and for comorbid major depression and any anxiety disorder (OR 1.55) in the children of parents with major depression and panic disorder, compared to children of parents having major depression without panic disorder. This

TABLE 3
LOGISTIC REGRESSION AND ADJUSTED ODDS RATIOS EXAMINING THE EFFECTS OF DEPRESSION AND ANXIETY IN THE PARENT, CONTROLLING FOR AGE AND SEX OF CHILD ON RATES OF DEPRESSION AND ANXIETY IN THE CHILD

Outcome in child	Parental Diagnoses								
	Panic + MDD vs. MDD			Panic + MDD vs. Other Dx.			MDD vs. Other Dx.		
	OR	(95% CI)	p value	OR	(95% CI)	p value	OR	(95% CI)	p Value
MDD ^a	1.35	(.937, 1.96)	.09	1.59	(1.10, 2.50)	.04	1.02	(.667, 1.57)	NS
MDD ^b	1.24	(.852, 1.82)	NS	1.47	(.927, 2.34)	.10	1.07	(.686, 1.68)	NS
Anxiety	1.39	(.980, 1.97)	.06	2.02	(1.31, 3.13)	.001	1.25	(.837, 1.87)	NS
MDD + anxiety	1.55	(.990, 2.45)	.06	2.15	(1.21, 3.87)	.009	1.11	(.667, 1.84)	NS

^aMDD in children according to DSM-III criteria.

^bMDD in children used same modified DSM-III criteria as in parents' diagnoses (4 week duration, impairment in social role).

differential risk is stronger (higher adjusted odds ratios) when the children of parents with both major depression and panic disorder are compared with children of parents with other psychiatric diagnoses, and disappears when the children of parents with major depression are compared to children of parents with other psychiatric diagnoses.

DISCUSSION

The purpose of this paper was to examine the specificity of transmission of major depression and panic disorder between parents and children and to replicate the findings of the family history study. The present study found a suggestion of increased risk of major depression and anxiety in children of parents having major depression and panic disorder. In addition, we replicated the family history findings for increased rates of separation anxiety (although not significant) in children of parents with major depression plus panic disorder when the sample was stratified by age and included children ages 6-17 years.

Depression and Anxiety Disorders in the Children

There is a suggestion of specificity of transmission of disorders in that the children of parents with major depression and panic disorder were at the greatest risk for both major depression and an anxiety disorder, although the rate was not statistically significantly different from the risk associated with having a parent with major depression only. It was a significantly higher rate in comparison to children of parents with other psychiatric disorders. These findings are consistent with our previous family history study (Weissman et al., 1984). There were no significant differences in the chil-

dren's rates of major depression (strict criteria) across parent groups, although there was a nonsignificant trend for greater rates in children of parents with major depression with and without panic. Strict criteria were the criteria used in previous studies; however, because of the resulting small sample size we felt it was important also to examine the rates of major depression according to DSM-III criteria. There was a significantly higher rate of major depression (DSM-III criteria) in children of parents with major depression with panic disorder compared to children of parents with other psychiatric disorders. Because of small sample size with strict criteria major depression, DSM-III criteria major depression was used for the children's diagnostic category of major depression with anxiety. This resulted in a similar increase in rates of major depression and anxiety in children of parents with major depression and panic disorder compared with children of parents with other psychiatric disorders.

It should be emphasized that these findings are consistent with previous findings on the same sample that showed an increased prevalence of major depression ($p < .05$) in children of parents either of whom were depressed (28.1%), in comparison to children of parents of whom neither was depressed (13.4%) (Weissman, 1988). In this paper, we went one step further and separated the either parent depressed group into either parent with major depression without panic disorder compared to either parent with major depression and panic disorder. In addition, we separated the neither parent depressed group into parents with other psychiatric disorders and parents with no disorder to further investigate the pattern of transmission. When we separated the parents by diagnosis into the current groups, we found that the highest risk (although not statistically significant) for depression (strict criteria or DSM-III criteria) in children occurred in the children of parents with comorbid depression and panic disorder. The original analyses did not take into account the comorbidity of parental disorders. The increased rate of depression in children of depressed parents in Weissman (1988) appears to be due to the higher rates of comorbid major depression and anxiety in the children of parents with comorbid major depression and panic disorder. It is still not clear from these analyses whether the higher risk for depression and anxiety in the children of parents with comorbid major depression and panic is due to the parents having two disorders or due to the panic disorder itself.

Separation Anxiety Disorder in Children

As in our previous study, the rate of separation anxiety in the children did not differ statistically by parent diagnosis. However, this may have been due to the small sample size. In our family history study, the children included were younger, 6 to 17 years of age as compared with ages 6 to 23 years in the present study. Fendrich et al. (1990) in a follow-up study of this sample showed that two-year recall of separation anxiety in older children and adults was poor. To make the studies more comparable, we stratified the sample by age and examined the rates in children 6 to 17 years of age. When we did so, the rate of separation anxiety increased (29.6%) and more closely approximat-

ed the rate in the children of parents with major depression and panic seen in the previous study (36.7%).

The higher though nonsignificant rates of separation anxiety in children of parents having major depression with panic disorder, in children ages 6–17 years, are similar to the previous findings for separation anxiety, which were based on family history about the children and did not take into account the diagnoses of both parents. The decrease in rates between studies may be due to a recall bias, since the children are much older now. Some forgetting may have occurred, which would be consistent with Fendrich et al.'s (1990) findings of older children's failure to recall separation anxiety disorder over a two-year follow-up. Only two children with separation anxiety in the original study did not participate in the follow-up study; therefore, the difference in results is not due to attrition.

In order to better understand the possible progression from a childhood anxiety disorder to panic disorder as an adult, a prospective study examining children with separation anxiety disorder followed into adulthood, or a study of precursors of anxiety in very young children of parents with panic disorder, such as those in the studies by Biederman et al. (1990), are needed.

Implications

There is increasing evidence for the existence of a familial factor in the anxiety disorders, although there have been few studies that directly assess the children of anxiety patients (Crowe, Noyes, Pauls & Slyman, 1983; Turner et al., 1987). The results of this epidemiological study suggest that the children of parents with major depression plus panic disorder are beginning to manifest similar disorders themselves. This is seen in the nonsignificant but suggestive trend for greater rates of major depression with anxiety in these children, as compared with those of parents with major depression only, as seen in Table 3. It also is seen in the lack of an association between parental diagnoses and child diagnoses of major depression without anxiety and anxiety without major depression. The lack of significant differences in rates of disorder between the children of parents with major depression with and without panic disorder prevents one from making any conclusions regarding the transmission of affective disorders from parents to children. The suggested association between comorbid major depression and panic in parents with comorbid major depression and anxiety in children supports the idea of the comorbid disorder as a distinct disorder from major depression alone or anxiety alone.

There is increasing evidence in the association between depression and anxiety disorders in parents and children (Brier, Charney, & Heninger, 1985; Last, Strauss, & Francis, 1987; Leckman, Weissman, Merikangas, Pauls, Prusoff, & Kidd, 1985; Stavrakaki & Vargo, 1986; Stavrakaki, Vargo, Boodoosingh, & Roberts, 1987). There has been speculation as to whether major depression and panic disorder have a common underlying diathesis or are in part an etiologically separate disorder (Leckman et al., 1983; Stavrakaki et al., 1989). The results of this study suggest a significant co-occurrence of anxiety and depression in children that is consistent with findings by other researchers (Kovacs et al., 1989; Bernstein & Garfinkle, 1986).

Limitations

One major limitation of this study is the sample size. Although the actual number of children studied makes it one of the largest high-risk studies, samples of 200 are still too small to study low-prevalence disorders such as panic. Another limitation is the lack of a parent proband group with panic disorder only. We are unable to determine whether the risk of having a parent with major depression and panic disorder differs from the effects of having a parent with panic disorder only. Similarly, we do not know whether the risk for these children is due to having a parent with two disorders or due to having one specific disorder such as panic. We cannot be fully certain whether or not major depression plus panic is a distinct disorder with its own familial characteristics, since we found significant differences in rates in comparison to children of parents with other psychiatric disorders, but not in comparison to those with major depression only. The parents may not be transmitting panic directly, as seen in the low and equivalent rates of panic disorder in children of parents with major depression with or without panic disorder, either because the children are not in an age of risk or because major depression plus panic is a distinct disorder. These questions can be best addressed with the inclusion of a sample of children whose parents have panic disorder only.

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