Childhood Sibling Relationships as a Predictor of Major Depression in Adulthood: A 30-Year Prospective Study

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Objective: The authors examined the quality of sibling relationships in childhood as a predictor of major depression in adulthood.

Method: Study subjects were 229 men selected for mental and physical health and followed from ages 20 through 50 and beyond as part of a study of adult psychosocial development. Data were obtained from interviews with participants and their parents at intake and from follow-up interviews and self-report questionnaires completed by participants at regular intervals. These data were used to rate the quality of relationships with siblings, the quality of parenting received in childhood, and family history of depression as well as the occurrence, by age 50, of major depression, alcoholism, and use of mood-altering drugs (tranquilizers, sleeping pills, and stimulants).

Results: Poorer relationships with siblings prior to age 20 and a family history of depression independently predicted both the occurrence of major depression and the frequency of use of mood-altering drugs by age 50, even after adjustment for the quality of childhood relationships with parents. Poor relationships with parents in childhood did not predict the occurrence of depression by age 50 when family history of depression and the quality of relationships with siblings were taken into account. Quality of sibling relationships and family history of depression did not predict later alcohol abuse or dependence.

Conclusions: Poor sibling relationships in childhood may be an important and specific predictor of major depression in adulthood. Further study of links between childhood sibling relationships and adult depression is warranted.

Disturbed childhood relationships have long been implicated as a risk factor for adult depression. The search for interpersonal roots of depression follows from the consistent observation that major depression commonly entails impaired functioning with others, including difficulties garnering and using support (1, 2). This search has focused primarily on relationships with parents (3). Despite the fact that children spend considerable time and emotional energy relating to brothers and sisters, little research has been done on sibling relationships as possible precursors of adult mental health and illness. In this study, we examined the quality of childhood relationships with siblings as a predictor of major depression in adulthood. We used prospective longitudinal data collected over three decades from early adulthood to age 50 and beyond in a study of men originally selected for mental and physical health and followed over the years as part of a study of adult psychosocial development (4, 5).

The empirical literature does not clearly identify disruptions in particular relationships as risk factors for depression. Instead, studies implicate childhood adversity of various kinds, notably poor care and neglect as a result of parental illness, death, and divorce (1, 6, 7). However, this lack of specificity may be due in part to the methodological difficulties that plague much of this research. Most studies rely on retrospective data to establish the quality of the childhood environment. Memory biases are of particular concern in studying the genesis of depression, because depressed mood at the time of assessment may influence recall of childhood experiences. A few prospective longitudinal studies have been conducted, but they have not spanned long periods; most have followed children into adolescence but not beyond (8–10). Previous studies have typically predicted depression at a specific time point. Because depression is episodic, assessment of mood at any one time is likely to miss many cases. With few exceptions (e.g., reference 11), studies of associations between childhood relationships and adult depression have not tested whether the association is specific to depression compared with other forms of psychopathology. Finally, few studies have specifically examined the quality of relationships with siblings.

Children typically experience intense affect in relationships with siblings, and hence these are among the most emotionally salient relationships in a child's development (12). Children also spend a great deal of time with siblings; in fact, in middle childhood, they spend more time with siblings than with parents (13). Conflict between siblings during middle childhood has been associated with greater anxiety, depression, and delinquency in adolescence (14).

More positive sibling relationships in early adolescence have been linked with less loneliness, less depression, and less substance abuse in mid-adolescence (10). Both in young adulthood and in old age, relationships with siblings have been linked with concurrent psychological well-being (15, 16). To date, however, no prospective studies have explored links between childhood sibling relationships and mental health across multiple decades of adult life.

Although hereditary factors play a prominent role in the genesis of depression, a considerable body of empirical evidence suggests that interpersonal deficits are independent risk factors for the development of mood disorders in adulthood (1). We tested the hypothesis that distant or dysfunctional sibling relationships and the absence of a close relationship with even one sibling in childhood would predict the development of major depression during the first three decades of adulthood, even after adjustment for the quality of parenting and family history of depression. We further hypothesized that sibling relationships of poorer quality would predict a common adjunct of adult depression, namely, an increased use of mood-altering drugs— tranquilizers, sleeping pills, and stimulants. Finally, we tested whether the predictive power of childhood sibling relationships was specific to adult depression or whether sibling relationships would predict another prevalent form of psychopathology, alcohol abuse and dependence.

Method

Participants

Between 1939 and 1942, a university health service recruited 268 male college sophomores (ages 18–19) for intensive multidisciplinary study (4, 5). These students were selected because college entrance examinations revealed no mental or physical health problems, and their deans perceived them as likely to become successful adults. All were white; 50% were on scholarships or needed to work during college to meet expenses; 64% eventually obtained graduate degrees. In adult life, most worked as physicians, lawyers, university professors, or business executives. The students' parents were interviewed and extensive family, social, and medical histories were obtained. Of the original study group of 268 men, 12 dropped out of the study during college and eight were killed in World War II. Definitive diagnostic information on the incidence of depression by age 50 was missing for 19 men. The cohort for this study therefore totaled 229.

On entering the study, the men were assessed by internists, psychiatrists, psychologists, and anthropologists. Participants completed questionnaires every 2 years thereafter, and they were reinterviewed by study staff at approximately ages 25, 30, and 50. The biennial questionnaires have continued up to the present, and the Partners Health Care System Human Research Committee has approved the study annually since 1992.

Antecedent Variables

All ratings were done by independent raters (no two variables were rated by the same person) who were blind to outcome data.

Relationship With Siblings. Two independent raters assessed the quality of each participant's relationship with siblings during childhood and adolescence after reviewing the following data, obtained at the time of entry into the study: psychiatrist's and family worker's notes on the participant's reports of his home life; family worker's interviews with parents; and a developmental history obtained from parents by the family worker. Ratings of sibling relationship quality were made on a 3-point scale (0=severe rivalry or conflict in the absence of closeness with at least one sibling; 1=absence of closeness with at least one sibling and absence of severe sibling rivalry or conflict; and 2=close relationship with at least one sibling). Participants who were close to at least one sibling were rated as such even if relations with other siblings were characterized as conflictual or not close. The two coders' ratings were added, and summed scores were raised by 1, resulting in a scale of 1–5. Twenty-six participants had no siblings and were excluded from analyses that used this variable.

Quality of Parenting. Two independent raters blind to other data rated the quality of parenting by each parent after reviewing the same sources of data as those used to rate sibling relationships. Parenting ratings were made on a 3-point scale (0=distant, hostile, or smothering; 1=average; and 2=nurturing, encouraged positive autonomy, fostered self-esteem). The two coders' ratings were added, and each summed score was raised by 1, resulting in a scale of 1–5. The mean of the ratings for mother and father was calculated, and this measure was used in regression models.

Death of a Parent in Childhood. Participants and their parents were asked whether a parent had died, and if so, the child's age at the time of the parent's death. This information was coded dichotomously as loss or no loss of a parent prior to age 18.

Family History of Depression. When participants entered the study, a family worker took an extensive social history from their parents, including whether any close relatives had suffered from mental illness or had committed suicide. When they were in their 60s, the men were questioned specifically about depressed relatives in the biennial questionnaires. A psychiatrist with clinical and research training used data from parents and from the men themselves to assess the presence of a family history of depression. A dichotomous variable, coded family history or no family history of depression, was used in all analyses.

Outcome Variables

Categorical Diagnosis of Major Depression. The incidence of at least one major depressive episode between ages 20 and 50 was assessed with the Indicators of Major Depressive Disorder Scale (17), which was designed to assess evidence of major depressive disorder in a community sample prior to the development of modern assessment instruments. A trained clinical and research psychiatrist (G.E.V.) reviewed each participant's complete records, including questionnaires, interview summaries, and medical records (from college through age 50) for eight correlates of depression that were consistent with DSM-III and DSM-IV definitions of major depressive disorder and with Robins and Guze's definition of a psychiatric disease (18): self-reported serious depression for 2 weeks or longer; diagnosis of clinical depression by a clinician not involved with the study; receiving antidepressant medication; self-reported anergia or decreased concentration for more than 2 weeks; neurovegetative signs of depression; attempted or completed suicide; sustained anhedonia; and psychiatric hospitalization for reasons other than alcohol abuse. Participants with three or more indicators of depression but without preexisting alcohol abuse were classified as depressed (19). Twenty-three participants met these criteria (mean=5.1 indicators of depression [SD=1.9]). The presence of one or two indicators of depression was not considered sufficient to make the diagnosis with confidence, so men with these ratings (N=19) were excluded from analyses. Six men had symptoms of mania as well as major depression and were included in the analyses (20, 21).

Use of Mood-Altering Drugs. Each participant's biennial reports of the frequency with which he used tranquilizers, sleeping pills, and stimulants between ages 30 and 50 were coded on a 4-point scale by an independent rater blind to other data (1=no drug use; 2=less than 30 days per year; 3=more than 30 days per year; 4=drug abuse or dependence).

Incidence of Alcohol Abuse and Dependence. Independent raters blind to other data applied DSM-III criteria to data from interviews, questionnaires, and medical records to assess the incidence of alcohol abuse and dependence at any time between ages 20 and 50 (22). Assessment was by consensus of two raters. Alcohol abuse and dependence ratings were combined to create a dichotomous variable (alcoholism or no alcoholism) that was used in analyses.

Statistical Analyses

For initial interpretability, each of our four ordinal predictors (quality of relationship with siblings, with mother, with father, and with both parents combined) was divided into three categories (poor, average, and good) to compare the percentage of men in each category who developed major depression. Chi-square trend tests were used to determine whether the incidence of depression decreased as the quality of the relationship improved. Identical analyses were carried out for frequency of use of mood-altering drugs and for alcohol abuse or dependence. Fisher's exact test was used to examine the association of a parental death by age 18 and family history of depression with each binary outcome (major depression, use of mood-altering drugs, and alcohol abuse or dependence), and t tests were used to compare men who developed depression and those who did not, with respect to two potential confounding variables: mean birth order and mean number of siblings.

To verify the apparent univariate relationships, binary logistic regression was conducted using family history of depression, quality of parenting, and closeness to siblings to predict the occurrence of depression by age 50. The model did not include parental death, birth order, or number of siblings because these covariates were not significant on univariate testing and because the small number of participants who developed major depression (N=23) limited the number of covariates that could be included in a regression model. The same concern about overfitting led us to use the original continuous ratings of sibling and parental relationships as predictors in our model. An analogous linear regression analysis was conducted to test family history of depression, quality of parenting, and closeness to siblings as predictors of the frequency of mood-altering drug use between ages 30 and 50. All tests of significance were two-tailed.

Results

Cohort Outcomes

Of the 229 men in this study cohort, 23 (10%) had three or more indicators of depression and were classified as having had major depression. The remaining 206 participants (90%) had no indicators of depression; as noted earlier, the 19 men in the original sample who had only one or two indicators of depression were deemed to have insufficient information to make the diagnosis with confidence and were excluded from the analyses. Table 1 lists the frequencies of both antecedent and outcome variables for the cohort.

TABLE 1. Childhood Family Characteristics and Mental Health Outcomes by Age 50 for 229 Men Followed Up Over 30 Years

Characteristic and Outcome	N	%
Characteristics during childhood		
Relationship with siblings (N=210)		
Poor (rated 1–2)	31	15
Average (rated 3)	107	51
Good (rated 4–5)	72	34
Relationship with mother (N=229)		
Poor (rated 1–2)	73	32
Average (rated 3)	100	44
Good (rated 4–5)	56	24
Relationship with father (N=229)		
Poor (rated 1–2)	76	33
Average (rated 3–4)	88	38
Good (rated 5)	65	29
Relationship with parents[a] (N=229)		
Poor (average rating 1–2)	82	36
Average (average rating 2.5–3.5)	88	38
Good (average rating 4–5)	59	26
Death of parent by age 18 (N=229)	21	9
Family history of depression (N=220)	79	36
Outcomes by age 50		
Major depression (three or more indications) (N=229)	23	10
Use of mood-altering drugs (rated 3–4) (N=227)	50	22
Alcohol abuse and dependence (N=224)	46	20

[a] Ratings for relationship with parents were based on the mean of the ratings for mother and father.

Predicting Adult Depression

Participants who had poorer relationships with their siblings in childhood were significantly more likely to become depressed as adults than those who had better sibling relationships (N=210; chi-square for trend=11.9, df=1, p<0.001). As shown in Table 2, 26% of participants with poor sibling relationships developed major depression by age 50, compared with 10% of those with average sibling relationships and only 3% of those with good sibling relationships. We found no statistically significant associations between the development of major depression and any of the parental quality predictors. As expected, a family history of depression had a significant association, with 16% of participants who had a family history of depression developing depression themselves by age 50, compared with only 6% of those with no family history (N=220, df=1; Fisher's exact test, p=0.02). The death of a parent in childhood did not predict depression in adulthood. In fact, none of the 21 men who experienced parental loss by age 18 became depressed by age 50. Birth order and family size did not predict adult depression. In summary, poor sibling relationship quality prior to age 20 and a family history of depression predicted the occurrence of depression by age 50, whereas poor parenting and death of a parent did not.

To determine the relative contributions of family history, quality of parenting, and quality of sibling relationships, a logistic regression analysis was conducted, with the occurrence of depression by age 50 as the binary outcome variable. As shown in Table 3, when analyses controlled for the quality of parenting received in childhood,

TABLE 2. Unadjusted Predictors of Mental Health Outcomes by Age 50 for 229 Men Followed Up Over 30 Years[a]

		Outcome Variable by Age 50								
		Major Depression			Use of Mood-Altering Drugs			Alcohol Abuse or Dependence		
Predictor Variable	N	N	%	p	N	%	p	N	%	p
Relationship with siblings				<0.001			0.017			0.39
Poor	31[b]	8	26		12	39		6	20	
Average	107[b]	11	10		23	22		26	25	
Good	72[b]	2	3		11	16		11	16	
Relationship with mother										
Poor	73[c]	11	15	0.12	19	26	0.48	18	25	0.15
Average	100[c]	8	8		19	19		20	21	
Good	56[c]	4	7		12	22		8	14	
Relationship with father				0.80						
Poor	76[d]	8	10		20	27	0.18	18	24	0.32
Average	88[d]	9	10		19	22		17	20	
Good	65[d]	6	9		11	17		11	17	
Relationship with parents				0.30			0.23			0.05
Poor	82[e]	11	13		22	27		23	28	
Average	88[e]	7	8		17	20		14	17	
Good	59[e]	5	8		11	19		9	15	
Death of parent by age 18				0.14			0.18			0.39
Yes	21[f]	0	0		2	10		6	29	
No	208[f]	23	11		48	23		40	20	
Family history of depression				0.021			0.027			0.38
Yes	79	13	16		24	30		19	24	
No	141	9	6		24	17		26	18	

[a] For assessment of relationships between predictor and outcome variables, a chi-square trend test was used for three-category predictors and Fisher's exact test for binary predictors.

[b] Because of missing data, the sample size was 30 in the "poor" group for alcohol abuse or dependence, 105 in the "average" group for alcohol abuse or dependence, and 70 in the "good" group for use of mood-altering drugs and for alcohol abuse or dependence.

[c] Because of missing data, the sample size was 72 in the "poor" group for use of mood-altering drugs, 95 in the "average" group for alcohol abuse or dependence, and 55 in the "good" group for use of mood-altering drugs.

[d] Because of missing data, the sample size was 75 in the "poor" group for use of mood-altering drugs and for alcohol abuse or dependence, 85 in the "average" group for alcohol abuse or dependence, and 64 in the "good" group for use of mood-altering drugs and for alcohol abuse or dependence.

[e] Because of missing data, the sample size was 81 in the "poor" group for alcohol abuse or dependence, 86 in the "average" group for use of mood-altering drugs, and 86 in the "average" group for alcohol abuse or dependence.

[f] Because of missing data, the sample size in the subgroup of subjects who did not have a parent die by age 18 was 206 for use of mood-altering drugs and 203 for alcohol abuse or dependence.

both a family history of depression and poorer quality of relationships with siblings before age 20 independently predicted the occurrence of depression by age 50. Men with a family history of depression had 3.9 times the odds of developing depression as men with no family history of depression, and men whose quality of relationships with their siblings was 1 point poorer on the 5-point scale had 2.2 times the odds of developing depression.

As an alternative illustration of our model, if we consider two men, one with and the other without a family history of depression, and both with average-quality relationships with parents and siblings, the one without a family history of depression would have a 3.9% chance of developing depression, whereas the one with a family history of depression would have a 13.5% chance of developing depression. Likewise, if we consider two men, one with relatively good relationships with his siblings (a rating of 4 on the 5-point scale) and the other with relatively poor relationships with his siblings (2 on the 5-point scale), and both with average-quality relationships with parents and no family history of depression, the one with better sibling relationships would have a 2.3% chance of developing depression, whereas the one with poor sibling relationships would have a 9.9% chance of developing depression. Finally, if we consider a

man who had parenting of average quality but relatively poor relationships with his siblings and a family history of depression, his risk of depression is 30%.

Predicting Use of Mood-Altering Drugs Between Ages 30 and 50

Table 2 shows that, as we found for major depression, the use of mood-altering drugs was significantly associated with both the quality of relationships with siblings (N=208; chi-square for trend=5.7, df=1, p=0.017) and a family history of depression (N=220, df=1; Fisher's exact test, p=0.027). Quality of parenting and the death of a parent by age 18 were not significantly linked with later drug use. These univariate findings were confirmed through a linear regression analysis (Table 4). Both a family history of depression and poorer relationships with siblings in childhood independently predicted increased use of mood-altering drugs in adulthood, whereas the quality of parenting received in childhood did not.

Predicting Incidence of Alcohol Abuse and Dependence Between Ages 20 and 50

Men diagnosed with alcohol abuse or dependence at any time between ages 20 and 50 (N=41) did not differ

TABLE 3. Logistic Regression Analysis Predicting Occurrence of Depression by Age 50 in Men Followed Up Over 30 Years (N=207)

Variable	B	SE	df	p	Odds Ratio[a]	95% CI
Family history of depression	1.36	0.52	1	0.01	3.9	1.4–10.8
Quality of parenting	−1.82	0.24	1	0.45	1.2	0.75–1.9
Relationships with siblings	−0.78	0.24	1	0.00	2.2	1.4–3.5

[a] For interpretability, the odds ratios have been reversed for quality of parenting and relationships with siblings to indicate the increased odds of developing depression as the quality of the relationship worsens.

TABLE 4. Linear Regression Analysis Predicting Use of Mood-Altering Drugs by Age 50 in Men Followed Up Over 30 Years (N=212)

Variable	B	SE	Standardized β	p	Change in R^2
Family history of depression	0.31	0.14	0.15	0.025	0.03
Quality of parenting	−0.08	0.06	−0.09	0.190	0.02
Relationships with siblings	−0.18	0.06	−0.23	0.001	0.05

from those without alcohol use disorders with respect to the quality of their sibling relationships in childhood. With the exception of the summed rating of the quality of parenting, none of the other antecedent variables were associated with alcohol abuse or dependence.

Discussion

This study implicates poor relationships with siblings in childhood as a risk factor for depression in adulthood. In this sample of men selected for excellent mental health at age 20 and then studied over a 30-year period, those who had distant or destructive relationships with siblings were significantly more likely than those with better sibling relationships to develop major depression by age 50. This was the case even when analyses controlled for hereditary factors, which suggests that poor relationships with siblings were not simply the result of a hereditary predisposition to depression. The validity of the link between childhood sibling relationships and adult depression is supported by the fact that sibling relationships also predicted more frequent use of mood-altering drugs in adulthood after analyses controlled for family history of depression and quality of parental relationships. The specificity of the link between sibling relationships and later depression is supported by the fact that childhood sibling relationships did not predict alcoholism in adulthood. This result is consistent with the hypothesis that poor sibling relationships predict adult depression in particular as opposed to predicting adult psychopathology in general.

It is noteworthy that the quality of parenting did not predict the occurrence of adult depression. How might we understand the finding that sibling relationships were more important predictors than relationships with parents? For most adults, the capacity to relate well with peers is central to both occupational and social functioning. Sibling relationships may help children develop specific capacities to mobilize interpersonal resources, and these capacities may promote emotional well-being in adulthood. The men in our sample were, by and large, from relatively stable and intact homes where the range in quality of parenting was not great. Parenting may be a more powerful predictor of adult depression in a sample in which child abuse, neglect, and significant family disruptions are more common. Alternatively, our measure of parenting may not have been sensitive enough to detect significant links between parenting quality and later depression.

To our knowledge, this is the first longitudinal study to examine sibling relationships as predictors of adult depression independent of relationships with parents. A major strength of the study is its use of data collected prospectively over 30 years. Also of note is that fact that data were collected from multiple sources on key variables, including family history of depression, sibling relationships, parental relationships, and occurrence of depression and alcoholism in adulthood. Moreover, repeated assessment of outcome variables in adulthood has the advantage of increasing the reliability of our measures.

This study does not address the issue of causality between early sibling relationships and later depression. Whether poor sibling relationships foster the development of adult depression, whether they are an early manifestation of vulnerability to depression, or whether vulnerability to mood disorder and poor sibling relationships act synergistically as risk factors for adult depression are questions that remain to be answered. The members of this sample were selected specifically for excellent mental health. Nevertheless, it is possible that for some of these men, difficulty forming a strong positive bond with at least one sibling in childhood was an early marker of biological or psychological processes that would eventually result in adult depression (23).

The study has several additional limitations. Diagnostic information was obtained and rated before DSM-III and DSM-IV criteria for major depression had been developed. However, the criteria used are consistent with modern criteria, and diagnoses were made by trained psychiatrists on the basis of multiple data sources. In addition, the cutoff of three indicators of major depression was relatively stringent, minimizing the likelihood of false positive diagnoses. When we repeated the analyses using a cutoff of two indicators of depression (adding six men to the de-

pressed group), the results were essentially unchanged. Parental discord during childhood has been associated with later negative outcomes, but we did not have sufficient data on parents' marriages to examine this important variable. The study sample consisted entirely of socioeconomically advantaged men who came of age in the World War II era. Further research is needed to determine whether and to what extent these findings are relevant to women, to other ethnic groups, to different social classes, and to different birth cohorts.

Despite these limitations, our findings highlight a potential childhood risk factor for depression that has been understudied. Replication studies could be conducted with data from other longitudinal cohorts (e.g., the Dunedin Study [24]). A next step would be to try to identify specific mechanisms (e.g., facilitation or impairment of peer relationships) by which childhood sibling relationships are linked with adult mental health. Finally, future research that sheds light on the direction of causality could have important clinical implications, informing clinicians about whether poor sibling relationships constitute an early sign of vulnerability to adult depression and whether these relationships might themselves be appropriate targets for preventive intervention.

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