General Medical Problems Among the Offspring of Depressed Parents: A 10-Year Follow-up

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ABSTRACT

Objective: To examine the association between both parental and offspring depression and the general medical problems of a sample of offspring at high and low risk for depression. **Method:** Offspring (*n* = 222) from families with either depressed or nondepressed parents were followed up for a period of 10 years. Data collected included psychiatric diagnoses derived from direct semistructured interviews and history of general medical problems and hospital visits. Rates of medical problems and hospitalizations were calculated, and offspring were stratified by depression status of both parent and offspring. **Results:** In analyses controlled for sociodemographic factors, offspring depression status was associated with a history of genitourinary disorders, headaches, respiratory disorders, other disorders, and hospitalizations in the offspring, and parental depression was associated with a history of unconsciousness and hospitalization in the offspring. After subjects were stratified by parental depression, significant associations between offspring depression and medical problems were found for only those offspring with a depressed parent. **Conclusions:** These findings suggest that a history of parental depression increases the risk for medical problems and hospitalization among depressed offspring. The co-occurrence of general medical and psychological problems among offspring of depressed parents may have implications for the treatment of both depression and comorbid medical disorders. *J. Am. Acad. Child Adolesc. Psychiatry,* 1998, 37(6):602–611. **Key Words:** depression, general medical problems, health status.

Examination of the comorbidity associated with depressive disorders is essential to improving treatment and reducing the burden of these common conditions. Depressive disorders are associated with limitations in functioning and well-being; poor social functioning; other psychiatric disorders such as anxiety disorders, substance abuse, and personality disorders; and general medical problems (Broadhead et al., 1990; Bruce et al., 1994b; Hays et al., 1995; Jaffe et al., 1994; Johnson et al., 1992; Maes et al., 1994; Wells et al., 1989a,b). The co-occurrence of general medical and psychological problems, in particular, amplifies the burden of depression on the individual, the family, and society, through increased functional impairment, increased utilization

of medical services, prolonged hospital stays, and the challenges resulting from treating the interacting symptoms of general medical and psychological disorders (Fulop et al., 1989; Howland, 1993; Wells et al., 1989b).

Evidence for a relationship between general medical problems and psychological disorders is found in a number of studies demonstrating a higher prevalence of general medical problems and greater use of health services among persons with depressive disorders (Clayer et al., 1995; Eastwood et al., 1972; Howland, 1993; Jaffe et al., 1994; Johnson et al., 1992; Manning and Wells, 1992; Weissman et al., 1986). Psychiatric disorders have also been shown to be more prevalent among those with existing general medical problems (Cavanaugh et al., 1989; Kroenke et al., 1994; Rodin and Voshart, 1986; Wells et al., 1988; Weyerer, 1990; Wise and Taylor, 1990). In addition, studies of mortality suggest that a history of depression is associated with higher rates of mortality resulting from natural causes (Bruce and Leaf, 1989; Bruce et al., 1994a; Winokur and Black, 1987).

The impact of depressive disorders is quite serious for the individual, but they can also have implications for subsequent generations in the form of dysfunction among the children of affected parents. The offspring of depressed parents have an increased risk for psychiatric disorders, general medical problems, behavioral and social problems, perinatal problems, and cognitive deficits (Bagedahl-Strindlund et al., 1988; Beardslee et al., 1983, 1996; Billings and Moos, 1985; Fendrich et al., 1990; Orvaschel, 1990; Todd et al., 1996; Weissman et al., 1982, 1986, 1992). Although general medical problems have been shown to be associated with both parental depression and one's own depression status, the additive and potentially interacting effect of two generations of depression on general health is yet to be investigated.

This study was designed to assess whether there is an increased susceptibility for specific medical conditions and hospitalizations, relative to the depression status of both the parent and offspring. Three questions are addressed: (1) Do depressed offspring compared with nondepressed offspring have a greater number of general medical problems and hospitalizations? (2) Do offspring of depressed parents compared with non-depressed parents have a greater number of general medical problems and hospitalizations? (3) Do two generations of depression increase the odds of general medical problems and hospitalization in the offspring? By examining these questions, we hope to expand our understanding of the relationship between depressive disorders and general medical problems and perhaps provide evidence to suggest certain models of causality.

A previous report of this sample described the association between parental depression status and the general health of the offspring at a younger age (Weissman et al., 1986). The offspring of parents with a history of depression were generally in poorer health than those of parents with no depression. Significant associations were found between parental depression and perinatal problems; delayed developmental landmarks; difficulty in managing the infant; greater prevalence of convulsions, seizures, and epilepsy; higher rates of injuries and accidents; and a history of operations requiring hospitalization. The current study builds on these findings by presenting the results of the latest 10-year follow-up of the sample and by taking into account the depression status of both parent and offspring.

METHOD

Sample

This analysis is based on a sample of 222 offspring at high and low risk for depression by virtue of the presence or absence of a lifetime history of major depression (as judged by Research Diagnostic Criteria [RDC]) in their parents. Offspring at high risk for depression were derived from families with at least one depressed parent, recruited at the Yale University Depression Research Unit in New Haven, Connecticut. Offspring at low risk for depression were children of normal parents with no history of psychiatric illness and were selected from a community survey conducted in New Haven. A complete description of the probands (parents) and their assessment has been published elsewhere (Weissman et al., 1982, 1992). All probands were white and group-matched for age and sex.

Initial interviews (time 1) were conducted in 1982; the sample consisted of 220 offspring from 91 families, who were between the ages of 6 and 23 years (153 offspring from 65 families with one or more depressed parent and 67 offspring from 26 families with neither parent depressed). Two years after the initial interview, all 91 families were contacted for a second interview (time 2). Eighty-five (93%) of the 91 families consented to participate at time 2. Of the 220 offspring who were interviewed at time 1, a total of 174 were interviewed at time 2. In addition, 43 siblings of the original 220 offspring who did not fall into the 6- to 23-year age category at time 1 were entered into the study at time 2.

We present findings from the third follow-up (time 10), which was 10 years after the initiation of the study. Probands, spouses of probands, and offspring were entered into the follow-up if they had been interviewed at least once at time 1 or 2. Two hundred sixty-three offspring of depressed and nondepressed parents were eligible, yet two offspring had died and one had Down syndrome. Of the remaining 260 offspring, 222 (85%) were interviewed at time 10. Ninety-one probands were eligible, yet four had died. Of the remaining 87 probands, 73 (84%) were interviewed at time 10. There were no significant differences in attrition rates of probands or offspring by parental status. In addition, attrition for the probands did not vary significantly by sex, age, or socioeconomic status. Among the offspring, however, although there was no difference in attrition by sex, older offspring were more likely to be interviewed than younger offspring (mean age = 28.5 versus 26.4 years; $p < .05$).

Assessments

Information on psychiatric symptoms and diagnoses, general medical problems, and history of hospitalization was collected at times 1, 2, and 10 (Weissman et al., 1982, 1992, 1997). Data from the following assessments were used in the current analyses.

Psychiatric Assessment of Parent. A lifetime diagnosis of major depression was determined for both parents from data collected at times 1, 2, and 10. Parents were assessed with the Schedule for Affective Disorders and Schizophrenia-Lifetime version (SADS-L) at times 1 and 2 (Endicott and Spitzer, 1978). At time 10, the SADS-L modified for the anxiety disorders (SADS-LA) was used, assessing the period from the last time of interview to the present. This version of the SADS-LA was modified to include RDC, *DSM-III*, and *DSM-III-R* criteria for anxiety and affective disorders (Mannuzza et al., 1986). "Best-estimate" procedures were used to determine final diagnoses at times 1, 2, and 10 (Leckman et al., 1982). Diagnoses were combined to produce one variable indicating a lifetime diagnosis of major depression.

Psychiatric Assessment of Offspring. A lifetime diagnosis of major depression was also determined for the offspring from data collected at times 1, 2, and 10. At times 1 and 2, direct interviews with the parents about the offspring and the offspring about themselves were conducted, using a version of the Schedule for Affective Disorders and Schizophrenia for School-Age Children-Epidemiologic version (K-SADS-E) modified to generate most *DSM-III* diagnoses (Orvaschel et al., 1982). At time 10, the offspring (now adults) were interviewed directly, with the SADS-LA, covering the period since the last time of interview to the present. The final diagnoses of the offspring at times 1, 2, and 10 were determined from "best-estimate" procedures. The diagnoses were then combined to indicate a lifetime diagnosis of major depression.

General Medical Problems in Offspring. Data were collected on the general medical history of the offspring at times 1, 2, and 10. Using a checklist format, either the parent or offspring (depending on the offspring age) indicated "yes" or "no" to a lifetime history of a list of specific medical problems. At the time of data analysis, all ambiguous reports of medical problems were coded by a physician, who was blind to the depression status of the offspring and parents. Medical problems were classified into 16 categories, according to the site or system of the body affected. Data from times 1, 2, and 10 were pooled to create cumulative variables indicating a lifetime history of medical conditions. Table 1 lists the medical problems included in the interview, grouped by the 16 summary categories. Current chronic problems represent only those reported at time 10 as "chronic medical problems which continue to interfere with the offspring's life." The medical problems included under "other disorders" are those that were not otherwise categorized by the given medical problem checklist. A summary variable was also created to indicate the total number of medical problems reported.

Hospital Visits. Data were collected on lifetime history of hospitalization for either an operation or other reasons. Hospitalizations for childbirth or psychiatric problems were excluded from this analysis. Offspring and parents were also questioned about whether the offspring had ever visited an emergency room or physician because of an accident or injury.

Sociodemographic Variables. Variables used in analysis were based on information collected at time 10 and included age, sex, education of the offspring (less than or equal to high school versus greater than high school education), and total household income of the offspring.

Statistical Analysis

Rates of general medical problems were calculated for offspring with depression compared with those without, as well as for offspring with neither parent depressed compared with those with at least one parent depressed. Maximum likelihood logistic regression models were then constructed (using the SAS LOGIST procedure) separately for depression status of the offspring, depression status of the parent, and depression status of the offspring stratified by parental depression status, predicting each of the general medical problem categories and hospital visits (SAS Institute, 1990). The logistic regression models were used to calculate odds ratios, which were adjusted for the potentially confounding effects of age, sex, education, and income. The regression coefficients for the predictors (either depression of parent or depression of offspring) were converted to odds ratios by taking the antilogarithm of the coefficient. Similar models were run with multiple linear regression (using PROC REG) to predict the continuous variable for the total number of general medical problems.

TABLE 1
General Medical Problems

Cancer

Cardiovascular disorders
   Angina, myocardial infarction
   Hypertension
   Mitral valve prolapse
   Other cardiovascular disorders

Skin disorders
   Skin disorder
   Scleroderma
   Other skin disorders

Endocrine or metabolic disorders
   Hyperthyroid
   Hypothyroid
   Diabetes
   Hypercholesterolemia
   Hypoglycemia
   Other endocrine or metabolic disorders

Gastrointestinal disorders
   Colitis
   Enteritis
   Gallbladder problems
   Hepatitis/jaundice
   Liver disease
   Ulcer
   Other gastrointestinal disorders

Genitourinary disorders
   Kidney disease
   Sexually transmitted diseases
   Other genitourinary disorders

Infectious disorders

Musculoskeletal disorders
   Myasthenia gravis
   Multiple sclerosis
   Other musculoskeletal disorders

Headaches
   Migraine headaches
   Repeated headaches

Other neurological disorders
   Convulsions, seizures, epilepsy
   Encephalitis
   Head injury
   Meningitis
   Polio, palsy, or paralysis
   Stroke
   Other neurological disorders

Bronchitis or emphysema (COPD)
   Bronchitis
   Emphysema

Other respiratory disorders
   Asthma
   Allergies
   Other respiratory disorders

Blood disorders

Unconsciousness

Other disorders

Current chronic problems

Note: COPD = chronic obstructive pulmonary disease.

RESULTS

Sample Characteristics

Two hundred twenty-two offspring, with a mean age of 28.7 years (range = 14 to 43 years), were studied (Table 2). Forty-three percent of the sample were male, 51% had greater than a high school education, and 55% had family incomes of $40,000 or more per year. Seventy-one percent of these offspring came from families with at least one parent depressed (*n* = 158) and were thus included among the high-risk group. The low-risk group, or those with neither parent depressed, comprised the remaining 29% (*n* = 64). Forty-six percent of the offspring had a lifetime history of depression (*n* = 102).

Depressed offspring were more likely to be female (67%) than nondepressed offspring (49%), yet the two groups did not differ by age, education, or income. No significant differences in age, sex, or education of offspring were found between the high- and low-risk groups, yet children with neither parent depressed had a significantly higher percentage of families with incomes greater than or equal to $40,000 per year. The rate of offspring depression also differed significantly by parental depression, such that the rate of depression was higher among offspring at high risk (54%) than among those at low risk for depression (27%).

Medical Problems/Hospitalizations and Offspring Depression

In 15 of the 16 categories of medical problems, prevalence rates were greater in offspring with a history of depression than in those with no depression (Table 3). After analyses were adjusted for sociodemographic factors, offspring depression was significantly associated with a history of genitourinary disorders (odds ratio [OR] = 4.94, 95% confidence interval [CI] 1.29 to 18.98), headaches (OR = 4.95, 95% CI 2.00 to 12.24), other respiratory disorders (OR = 2.39, 95% CI 1.32 to 4.31), and other disorders (OR = 2.46, 95% CI 1.22 to 4.97). Hospitalizations for both operations and other reasons and visits to an emergency room or physician's office because of an accident or injury were more frequent for offspring with depression (Table 3), yet only the hospitalizations for an operation (OR = 1.98, 95% CI 1.11 to 3.51) and hospitalizations for other reasons (OR = 2.86, 95% CI 1.43 to 5.72) remained significant once analyses were adjusted for sociodemographic factors.

Medical Problems/Hospitalizations and Parental Depression

Report of general medical problems was generally greater in offspring in the high-risk group compared with the low-risk group in 12 of 16 categories (Table 4).

TABLE 2
Demographics and Depression Status of Offspring

	Total Sample (*n* = 222)	Offspring		Parents	
		Not Depressed (*n* = 120)	Depressed (*n* = 102)	Neither Depressed (*n* = 64)	One or Both Depressed (*n* = 158)
Age (mean ± SD)	28.7 ± 6.0	27.6 ± 6.3	30.0 ± 5.4	28.5 ± 5.4	28.8 ± 6.3
Sex (%)					
Males	42.8	50.8	33.3	45.3	41.8
Females	57.2	49.2	66.7*	54.7	58.2
Education (%)					
≤High school	49.3	50.0	48.5	47.6	50.0
>High school	50.7	50.0	51.5	52.4	50.0
Income (%)					
<$40,000/yr	44.7	39.5	50.5	30.7	50.3
≥$40,000/yr	55.4	60.5	49.5	69.4	49.7*
Offspring depression (%)					
Not depressed	54.1	—	—	73.4	46.2
Depressed	46.0	—	—	26.6	53.8***

Note: p Value corresponds to *t* test for comparison of mean age and χ^2 for comparison of frequencies of sex, education, income, and depression status.
* *p* < .05; *** *p* < .001.

TABLE 3
General Medical Problems/Hospital Visits of Offspring by Offspring Depression

	Offspring Not Depressed (n = 120) (%)	Offspring Depressed (n = 102) (%)	OR^a (95% CI)
Cancer	2.5	3.9	0.94 (0.18, 4.80)
Cardiovascular disorders	7.5	14.7	1.76 (0.71, 4.37)
Skin disorders	15.0	22.6	1.73 (0.84, 3.56)
Endocrine or metabolic disorders	2.5	8.8	3.47 (0.87, 13.82)
Gastrointestinal disorders	8.3	15.7	1.58 (0.65, 3.82)
Genitourinary disorders	2.5	11.8	4.94 (1.29, 18.98)*
Infectious disorders	11.7	14.7	1.19 (0.52, 2.75)
Musculoskeletal disorders	6.7	9.8	1.26 (0.43, 3.65)
Headaches	5.8	27.5	4.95 (2.00, 12.24)**
Other neurological disorders	26.7	22.6	0.93 (0.48, 1.80)
Bronchitis or emphysema (COPD)	10.0	18.6	1.88 (0.82, 4.28)
Other respiratory disorders	41.7	58.8	2.39 (1.32, 4.31)**
Blood disorders	5.0	8.8	1.62 (0.53, 4.94)
Other disorders	14.2	29.4	2.46 (1.22, 4.97)*
Unconsciousness	19.2	27.5	1.58 (0.81, 3.07)
Current chronic medical disorders	5.0	14.9	2.73 (0.99, 7.56)
Hospitalization/operation	48.3	66.7	1.98 (1.11, 3.51)*
Hospitalization/no operation	16.7	33.3	2.86 (1.43, 5.72)**
Emergency room visit	85.0	88.2	1.61 (0.66, 3.89)

Note: OR = odds ratio; CI = confidence interval; COPD = chronic obstructive pulmonary disease.
^{a} Odds ratio for medical problems/hospital visits for offspring with depression versus offspring without depression, adjusted for age, sex, income, and education.
* $p < .05$; ** $p < .01$.

Although a large number of medical problems were more prevalent among those with depressed parents, adjusted odds ratios were significant only for report of unconsciousness (OR = 3.62, 95% CI 1.43 to 9.14). Hospitalizations for both an operation and other reasons, and visits to the emergency room or physician's office, were also greater in offspring of depressed parents than in those with neither parent depressed (Table 4), yet adjusted odds ratios were significantly higher only for hospitalizations for operations (OR = 2.18, 95% CI 1.17 to 4.09).

Medical Problems/Hospitalizations: Offspring and Parental Depression

Because there was a higher prevalence of depression in offspring with a depressed parent, analyses were conducted to control for the effects of depression in both generations and isolate the associations between both parental and offspring depression status and the medical conditions. Initial regression models were run with both offspring and depression status included as independent variables and with a term for the interaction between offspring and parental depression status (data not shown). A significant interaction made it necessary to run all sub-

sequent analyses with stratification. Odds ratios for the general medical problems and hospitalization history, for nondepressed offspring compared with depressed offspring, stratified by parental depression status, are presented in Table 5. Stratification demonstrated that among the low-risk offspring, neither history of general medical problems nor hospitalization was significantly associated with offspring depression status.

In contrast, among the high-risk group, offspring depression status was associated with a greater odds of a history of genitourinary disorders (OR = 5.08, 95% CI 1.03 to 25.1), headaches (OR = 7.10, 95% CI 1.97 to 25.62), other respiratory disorders (OR = 2.99, 95% CI 1.46 to 6.12), other disorders (OR = 2.64, 95% CI 1.13 to 6.19), and hospitalization for reasons other than an operation (OR = 4.72, 95% CI 1.92 to 11.59).

Overall General Health: Offspring and Parental Depression

As an indicator of overall general health status, the association between depression and the total number of reported medical problems was examined. The mean number of medical problems was significantly ($p < .05$) higher among the depressed offspring (mean = 3.1, SD = 2.2) compared with the nondepressed offspring

(mean = 1.8, SD = 1.6) and among the offspring of depressed parents (mean = 2.6, SD = 2.1) compared with the offspring of nondepressed parents (mean = 2.0, SD = 1.7). The number of medical problems remained significantly associated with both offspring depression status (β coefficient = 1.15; SE = 0.26; p = .0001) and parental depression status (β coefficient = 0.69; SE = 0.30; p = .0217) after sociodemographic factors were controlled. Once the sample was stratified by parental depression status, offspring depression status was significantly associated with the total number of medical problems only among those with a depressed parent (β coefficient = 1.23; SE = 0.33; p = .0002).

DISCUSSION

The principal findings of this study suggest that a history of parental depression increases the risk for general medical problems among depressed individuals. When two generations of depression were examined simultaneously, offspring depression status was associated with a history of general medical problems and hospital visits only among those offspring who also

had a depressed parent. This association was demonstrated for genitourinary disorders, headaches, respiratory disorders, other disorders, and hospitalizations and for a summary variable representing the total number of general medical problems.

In general, the findings linking offspring depression to medical problems, without taking parental depression into account, are consistent with the existing literature. Reports from the Epidemiologic Catchment Area (ECA) study have demonstrated associations between a lifetime history of affective disorders and both chronic medical conditions and self-reported fair or poor physical health (Johnson et al., 1992; Wells et al., 1989a). Clinic-based studies have also shown higher rates of medical conditions and self-reported fair or poor health among those with psychiatric disorders (Eastwood and Trevelyan, 1972; Jaffe et al., 1994).

The specific disorders that we found to be associated with depression were also generally consistent with the literature. A number of studies have demonstrated the association between depression and both migraine and unspecified headaches (Breslau and Davis, 1993; Merikangas et al., 1988, 1993), as well as between

TABLE 4
General Medical Problems/Hospital Visits of Offspring by Parental Depression

	Neither Parent Depressed (n = 64) (%)	One or Both Parents Depressed (n = 158) (%)	OR^a (95% CI)
Cancer	4.7	2.5	0.24 (0.04, 1.35)
Cardiovascular disorders	7.8	12.0	1.39 (0.48, 3.99)
Skin disorders	12.5	20.9	2.38 (0.96, 5.89)
Endocrine or metabolic disorders	1.6	7.0	4.39 (0.54, 35.73)
Gastrointestinal disorders	12.5	11.4	0.76 (0.30, 1.95)
Genitourinary disorders	3.1	8.2	2.47 (0.53, 11.61)
Infectious disorders	9.4	14.6	2.00 (0.70, 5.66)
Musculoskeletal disorders	6.3	8.9	1.71 (0.46, 6.38)
Headaches	14.1	16.5	1.05 (0.44, 2.49)
Other neurological disorders	20.3	26.6	1.53 (0.72, 3.22)
Bronchitis or emphysema (COPD)	14.1	13.9	1.03 (0.42, 2.53)
Other respiratory disorders	48.4	50.0	1.14 (0.61, 2.12)
Blood disorders	7.8	6.3	0.78 (0.24, 2.46)
Other disorders	18.8	22.2	1.38 (0.63, 3.00)
Unconsciousness	10.9	27.9	3.62 (1.43, 9.14)*
Current chronic medical disorders	4.7	11.5	2.33 (0.65, 8.39)
Hospitalization/operation	46.9	60.8	2.18 (1.17, 4.09)*
Hospitalization/no operation	17.2	27.2	1.56 (0.72, 3.38)
Emergency room visit	89.1	85.4	0.60 (0.22, 1.66)

Note: OR = odds ratio; CI = confidence interval; COPD = chronic obstructive pulmonary disease.

^{a} Odds ratio for medical problems/hospital visits for offspring with at least one parent depressed versus offspring with neither parent depressed, adjusted for age, sex, income, and education.

* p < .05.

TABLE 5
General Medical Problems/Hospital Visits of Offspring by Parental and Offspring Depression

	Neither Parent Depressed		One or Both Parents Depressed	
	OR[a]	(95% CI)	OR[a]	(95% CI)
Cancer	1.17	(0.08, 17.78)	1.91	(0.15, 24.97)
Cardiovascular disorders	5.00	(0.66, 37.98)	1.25	(0.45, 3.51)
Skin disorders	1.57	(0.22, 11.43)	1.48	(0.66, 3.33)
Endocrine or metabolic disorders	—[b]		3.73	(0.74, 18.79)
Gastrointestinal disorders	1.62	(0.31, 8.41)	1.91	(0.61, 5.99)
Genitourinary disorders	2.67	(0.12, 59.62)	5.08	(1.03, 25.1)*
Infectious disorders	0.79	(0.06, 10.20)	1.11	(0.44, 2.80)
Musculoskeletal disorders	—[b]		1.62	(0.45, 5.78)
Headaches	3.67	(0.80, 16.90)	7.10	(1.97, 25.62)**
Other neurological disorders	0.18	(0.02, 1.65)	1.05	(0.49, 2.25)
Bronchitis or emphysema (COPD)	4.18	(0.69, 25.51)	1.56	(0.59, 4.09)
Other respiratory disorders	1.57	(0.43, 5.64)	2.99	(1.46, 6.12)**
Blood disorders	4.52	(0.56, 36.22)	1.11	(0.29, 4.33)
Other disorders	1.97	(0.42, 9.18)	2.64	(1.13, 6.19)*
Unconsciousness	0.51	(0.05, 5.17)	1.43	(0.68, 2.99)
Current chronic medical disorders	0.92	(0.03, 25.00)	3.12	(0.94, 10.33)
Hospitalization/operation	1.22	(0.35, 4.27)	1.88	(0.95, 3.72)
Hospitalization/no operation	0.57	(0.10, 3.19)	4.72	(1.92, 11.59)**
Emergency room visit	0.75	(0.10, 5.51)	2.21	(0.81, 6.05)

Note: OR = odds ratio; CI = confidence interval; COPD = chronic obstructive pulmonary disease.

[a] Odds ratio for medical problems/hospital visits for offspring with depression versus offspring without depression, stratified by parental depression status, adjusted for age, sex, income, and education.

[b] Sample size insufficient to support odds ratio.

* $p < .05$; ** $p < .01$.

depression and allergies, asthma, and other respiratory problems (Bell et al., 1991; Jaffe et al., 1994; Janson et al., 1994; Wells et al., 1989a). Furthermore, our failure to demonstrate significant associations between depression and either cancer or gastrointestinal disorders is consistent with the findings of others (Jaffe et al., 1994; Wells et al., 1989a; Zonderman et al., 1989).

Findings with regard to cardiovascular disorders have been inconsistent. Consistent with our finding, some investigators have not found an association between depression and either hypertension or heart disease (Jaffe et al., 1994). Wells et al. (1989a), however, did find significant associations between both heart disease and hypertension and depression status in the ECA sample. Inconsistencies between our results and those of the ECA study may be due to the low prevalence of these disorders in our offspring, which is largely a result of the relatively young age of our sample (mean = 28.7 years) compared with the ECA (mean = 41.1).

The association between depression and a greater number of hospital visits is in keeping with the literature addressing the effects of mental health status on

the use of general medical services. Manning and Wells (1992), using the RAND Health Insurance Experiment, found that mental health status was significantly associated with both inpatient and outpatient medical use in a general population sample. Although they attributed the increased use of medical service primarily to the associated general medical problems of psychologically distressed people, they were able to demonstrate independent effects of mental health status on inpatient medical use.

Our findings relating to parental depression, not taking into account offspring depression, are limited to a report of unconsciousness and hospitalization for an operation. A possible explanation for the association with unconsciousness in the offspring may be related to an increased prevalence of accidents resulting from inadequate parental monitoring among depressed parents. In general, however, our findings are in keeping with those of others who have shown increased impairment in children of depressed parents (Beardslee et al., 1983). Billings and Moos (1985) reported findings from a longitudinal study of children of depressed parents, which suggested that offspring of depressed parents had

more general medical problems, more health risk factors (i.e., smoking, drinking, and drug use), and poorer functioning than children of nondepressed controls. Of particular interest in their findings and consistent with the lifetime measurement of depression used in our study, this association was found for parents whose depression continued through the follow-up period as well as among those whose depression had remitted. Thus, it is suggested that having a parent with a lifetime diagnosis of depression, regardless of whether it is current, still presents a risk for medical problems.

The finding that is unique to our study and unexamined in the literature is the effect of two generations of depression on general medical problems. After taking into account parental depression, we found that offspring depression status was significantly associated with a higher prevalence of general medical problems and hospital visits only among those with a depressed parent. Thus, a history of two generations of depression in both the offspring and the parents was necessary to exhibit a significant association between depression and impaired general health. This interaction in our data may help elucidate the current understanding of the mechanism or reason for the commonly found association between depression and medical problems.

The association between general medical problems and depression may be explained by depression predisposing one to medical problems, general medical problems predisposing one to depression, or a common underlying risk factor for both the medical problem and the depression. Numerous hypotheses with psychogenic, psychodynamic, biochemical, or life stress components have been presented to account for such associations (Weyerer, 1990). Murphy and Brown (1980) postulated that psychiatric disturbances, such as depression, may actually be the mediating factor between severe stressful life events and physical illness. Two generations of depression, under this hypothesis, could represent a response to a common set of life stresses possibly emanating from the family environment. Impaired general health in the offspring would then be a direct result of the offspring depression.

Increased prevalence of general medical problems among those with a family history of depression provides support to hypotheses that have a familial basis (either genetic or environmental). Some of the factors associated with the increased rate of depression among

offspring of depressed parents (e.g., family environment, genetics) may also be working to increase the vulnerability toward impaired general health. Alternatively, depressed parents and their offspring may be more likely to identify medical illness, seek care and receive a diagnosis, or use the health care system for emotional needs. In addition, having a depressed parent may increase one's awareness or sensitivity to deviations in health.

An example of how our findings could support hypotheses suggesting a common underlying factor is found in the literature regarding the association between allergies and depression. Some evidence has been presented to suggest that dysfunction in both the adrenergic and cholinergic systems may predispose people to both atopic disorders (e.g., allergies and asthma) and some forms of depression (Marshall, 1993). Factors such as these, which contribute to both depression and medical problems, may be passed on from one generation to the next. This transmission could explain, in part, why we found significant medical comorbidity only among those with two generations of depression.

Our results should be viewed in light of some limitations in the data. In particular, our indicators of general medical problems and hospitalizations are based solely on report by the parent or offspring and are not confirmed by medical records. These variables were derived from a "yes" or "no" response to any history of specific conditions; thus there is no information about the severity of the medical problems. Second, because our sample is relatively young, many of the offspring have not had the opportunity to develop some of the medical problems reported in this study (e.g., cardiovascular disorders and cancer). The age range for this sample is also quite broad, but we have attempted to control for this factor in the analyses. Finally, the analyses in this report have focused on the lifetime prevalence of both depression and medical problems, thus limiting our ability to address issues relating to the temporal association between these factors. Determining the precise onset of both general medical problems and depressive episodes, especially when judged by retrospective reporting, is difficult. Future studies could further contribute to the understanding of the mechanism of action involved in medical comorbidity by examining the relative timing of both depression and general medical problems.

Clinical Implications

The finding that two generations of depression place one at higher risk for general medical problems has important implications for the identification and effective treatment of both depression and comorbid medical disorders. The co-occurrence of general medical and psychological problems makes medical and psychiatric management more complicated. Optimal treatment of one set of problems must include consideration of the others. Awareness of the co-occurrence of general medical problems in those with a family history of depression could result in earlier identification and more comprehensive management of patients. Consequently, there is potential for a reduction in the cost of treatment and improvement in the long-term outcome of care.

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The Moral Education of Medical Students. Robert Coles, MD

The author begins his essay by discussing George Eliot's novel *Middlemarch,* in which a doctor, early in his career, wanders from his idealist commitment to serving the poor. Although he establishes a prominent practice, he considers himself a failure because "he had not done what he once meant to do." The essay explores how many of us (physicians included) forsake certain ideals or principles — not in one grand gesture, but in moment-to-moment decisions, in day-to-day rationalizations and self-deceptions, until we find ourselves caught in lives whose implications we have long ago stopped examining, never mind judging. Medical education barrages students with information, fosters sometimes ruthless competition, and perpetuates rote memorization and an obsession with test scores — all of which stifle moral reflection. Apart from radically rethinking medical education (doing away with the MCAT, for example, as Lewis Thomas proposed), how can we teach students to consider what it means to be a good doctor? Calling upon the work of Eliot, Walker Percy, and others, the author discusses how the study of literature can broaden and deepen the inner lives of medical students and encourage moral reflectiveness. **Acad Med** 1998;73:55–58