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Paternal Depressive Symptoms and Child Behavioral or Emotional Problems in the United States

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Paternal Depressive Symptoms and Child Behavioral or Emotional Problems in the United States

WHAT'S KNOWN ON THIS SUBJECT: Much is known about the effects of maternal depression on child health and function. In stark contrast, virtually nothing is known about the association of paternal mental health problems and depression and child functioning.

WHAT THIS STUDY ADDS: This study revealed an independent association between fathers' mental health problems and depressive symptoms and increased rates of child emotional and behavioral problems among a large nationally representative sample of children in the United States.

abstract

FREE

BACKGROUND: The negative effects of maternal mental health problems on child health are well documented. In contrast, there is a profound paucity of information about paternal mental health's association with child health.

OBJECTIVE: To investigate the association of paternal mental health problems and depressive symptoms and children's emotional or behavioral problems.

METHODS: We analyzed Medical Expenditure Panel Survey data, which included a representative sample of US children ($N = 21\,993$) aged 5 to 17 years and their mothers and fathers. The main outcome measure was child emotional or behavioral problems assessed by using the Columbia Impairment Scale.

RESULTS: Paternal depressive symptoms, as assessed using the Patient Health Questionnaire–2, and mental health problems, more generally, assessed by using the Short-Form 12 Scale, were independently associated with increased rates of child emotional or behavioral problems even after controlling for numerous potential confounders including maternal depressive symptoms and other mental health problems. The adjusted odds ratio (aOR) for emotional or behavioral problems among children of fathers with depressive symptoms was 1.72 (95% confidence interval [CI]: 1.33–2.23) and the aOR associated with abnormal paternal scores on the mental component scale of the Short-Form 12 was 1.33 (95% CI: 1.10–1.62) for those within 1 SD below average and 1.48 (95% CI: 1.20–1.84) for those >1 SD below average.

CONCLUSIONS: To the best of our knowledge, this is the first study to use a representative US sample to demonstrate that living with fathers with depressive symptoms and other mental health problems is independently associated with increased rates of emotional or behavioral problems of children. *Pediatrics* 2011;128:1126–1134

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KEY WORDS

paternal mental health, child outcomes, child behavior, child emotional problems

ABBREVIATIONS

MEPS—Medical Expenditure Panel Survey
CIS— Columbia Impairment Scale
PCS—Physical Component Scale
MCS—Mental Component Score
SF-12—Short-Form 12
PHQ-2—Patient Health Questionnaire–2
aOR—adjusted odds ratio
CI—confidence interval

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An extensive amount of literature documents the adverse effects of maternal depression and other mental health problems on the mental and physical well-being of children. Studies have shown that maternal postnatal psychiatric issues, including anxiety and depression, negatively affect crucial early mother-child interactions, thereby increasing the risk of mental health disorders in children.[1–5] Numerous other studies have highlighted the association between maternal mental health problems across childhood and its detrimental effects on children's mental health and physical functioning.[6–12]

In stark contrast, there is a paucity of literature regarding the association between paternal depression and other mental health problems and child health and functioning.[13–25] The limited amount of research literature that does exist focuses, in large part, on postpartum paternal depression, suggesting an association between postpartum paternal depression and poor childhood outcomes.[26] However, studies investigating paternal mental health outside the newborn period have tended to use small and often atypical samples from which it is difficult to generalize to the population at large, although they too tend to suggest a similar association between fathers' mental health and child outcomes.[14–25] Given that mothers spend substantially more time in direct interaction with their children than do fathers, it seems reasonable to hypothesize that maternal mental health problems would be associated with higher rates of children's emotional or behavioral problems than paternal mental health problems would be. Similarly, the literature on the high concordance between mothers' and fathers' mental health and the transmission of depression within families might suggest that mental health problems in general, and depression in particular, when occurring in both mothers and fathers in the same family, is associated with even higher rates of child emotional or behavioral problems.[27–29]

This article reports the findings of analyses conducted using a large, nationally representative sample of the US population to evaluate the following 3 hypotheses: first, that children of fathers with mental health problems and depressive symptoms have higher rates of emotional or behavioral problems; second, that the rates of such problems are lower among children with fathers who have mental health problems than among children with mothers with these problems; and third, that rates of emotional or behavioral problems are highest among children who have both mothers and fathers with mental health problems and depressive symptoms.

METHODS

Data Source

Data were used from the Medical Expenditure Panel Survey (MEPS), 2004–2008. MEPS, a nationally representative survey of the US civilian, noninstitutionalized population, is cosponsored by the Agency for Healthcare Research and Quality and the National Center for Health Statistics, and has been conducted annually since 1996.

Households participating in the MEPS were selected from those that participated in the National Health Interview Survey in the previous year. Data for each participating household were collected during 5 interview sessions over a period of 2 calendar years. Trained interviewers, using computer-assisted personal interviewing technology, conducted the interview in participants' homes. During each round, typically the same adult respondent was interviewed about the health and health care of the household on behalf of the entire household. The Household Component of the MEPS, which was the primary source of data for this study, contains sociodemographic and health-related information about the families.[30] Additional information was taken from the supplemental sections of the MEPS. All data collected were weighted and annualized to create national estimates. A detailed description of the MEPS is available on its Web site (www.meps.ahrq.gov).

TABLE 1 Items of the CIS

How much of a problem does child have with
Getting along with mother
Getting along with father
Feeling unhappy or sad
His or her behavior at school
Having fun
Getting along with adults
Feeling nervous or afraid
Getting along with brothers or sisters
Getting along with other kids
Getting involved in activities like sports or hobbies
His or her schoolwork
His or her behavior at home
Staying out of trouble

Respondents rated each of the 13 items on a scale from 0 (no problem) to 4 (a very big problem). Questions not applicable for a specific child were coded as "asked, but inapplicable."[31]

Study Variables

Emotional and Behavioral Problems

The behavioral or emotional functioning of children was assessed using the Columbia Impairment Scale (CIS), a 13-item parent report scale summarized in Table 1. It is administered by a lay interviewer, has been found to have good reliability and validity, and correlates well with clinicians' scores on the Children's Global Assessment Scale, mental health service referrals, and school difficulties. It has been used in a number of previous studies.[31–33] The CIS was administered to adult respondents of participating households for all children ages 5 to 17 years living in those homes. Respondents were asked, "In general, how much of a problem do you think [person] has

with [each of the 13 items on the CIS]." Responses to each item ranged from 0 (no problem) to 4 (a very big problem), with the summated score ranging from 0 to 52. CIS scores of ≥16 indicate that the child has a behavioral or emotional problem.[28] All 13 items on the CIS were answered in 92.12% of cases; in 4.40% of cases, 1 item was not answered; in 0.58% of cases, 2 items were unanswered; in 0.11% of cases, 3 to 5 items were unanswered; 11 items were left unanswered in 0.01% of cases; and all 13 items were not completed in 2.78% of cases.

Imputed mean scores were used to assign values to missing CIS items, consistent with previous studies.[32] The CIS measures the presence of emotional problems, behavioral problems, or both in a given child; because of its unifactorial nature, the CIS cannot discriminate between these 2 problems. Hence, CIS scores ≥16 indicate emotional or behavioral problems in the children or adolescents. Elevated scores could indicate problems either with emotional or behavioral problems, or both.

Child and Family Characteristics

Covariates and potential confounders included child age, gender, race/ethnicity, and whether the child was living with a smoker(s). Child age was divided into school-aged (aged 5–11 years) and adolescents (aged 12–17 years). For parents, variables investigated included paternal and maternal mental and physical health, paternal and maternal depressive symptoms, smoking status, and paternal and maternal educational achievement.

Parental Physical and Mental Health

Maternal and paternal physical and mental health were investigated using the Physical Component Scale (PCS) and Mental Component Scale (MCS) of Short-Form 12 (SF-12). The SF-12 is a 12-item self-report measure of health that has been well validated and well studied in the general population, as well as in specific populations with physical (eg, arthritis, diabetes, myocardial infarction) and mental health (eg, depression, anxiety) issues.[34–37] PCS and MCS scores range from 0 to 100, with lower scores indicating worse health. Mean scores and SDs were calculated for both the PCS and the MCS, and scores were categorized as (1) average or above average, (2) within 1 SD below average, and (3) >1 SD below average.

Parental Depressive Symptoms

Maternal and paternal depressive symptoms were analyzed using the Patient Health Questionnaire–2 (PHQ-2). The PHQ-2 is an abbreviated, self-administered form of the Primary Care Evaluation of Mental Disorders in which patients are asked 2 questions based on depressive symptoms and anhedonia.[38] These questions are intended to be used for depression screening and are not equivalent to a *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* diagnosis of depression. PHQ-2 scores range from 0 to 6, and a cutoff of ≥3 is used for screening for clinically significant depression.[38] The specificity of the PHQ-2 has been found to be high (0.92), with a much lower sensitivity (0.61) when compared with the Composite International Diagnostic Interview.[39] PHQ-2 scores ≥3 have been found to have a sensitivity of 0.74 and a specificity of 0.75 when compared with those who have met the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* criteria for major depression, and a sensitivity of 0.96 and specificity of 0.82 among those who meet the criteria for major depression using the PHQ-9 test, a more extensive version of the PHQ-2 test.[40]

Sample Selection

The MEPS 2004–2008 contains information on ~35 708 children aged 5 to 17 years and their families. Younger children were excluded because CIS is not valid for children younger than 5 years. The following inclusion criteria were applied: children aged 5 to 17 years who were members of 2-parent households (including biological, adoptive, or stepparents), in which there was available data for child CIS items, and parental MCS and PCS scores. Of the potential 35 708 children, 13 020 were living in single-parent households or homes with no parent and thus did not fit eligibility criteria, 198 children were excluded because of missing maternal or paternal data (ie, there were missing data for a father or a mother on the SF-12), and an additional 497 children were excluded because the survey inadvertently failed to provide them with "weights" needed to adjust for the sample's complex sampling design. Thus, the final sample size was 21 993 children and their mothers and fathers.

Statistics and Data Analyses

The associations between emotional or behavioral problems (CIS ≥16) and age, gender, race, parental mental and physical health, parental depressive symptoms and smoking status, living with smoker(s), and parental education first were examined in bivariate analyses using χ^2 tests. All variables included in the bivariate analyses were included in the multivariate analyses. For multivariate analyses, logistic regression analyses were used to assess the independent associations between CIS scores ≥16 and the aforementioned child and parental characteristics. All analyses were conducted by using SAS software (SAS Institute, Inc, Cary, NC), and the complex sampling design was adjusted for by using

SUDAAN software (Research Triangle Institute, Research Triangle Park, NC), which enables assessment of national inferences.[41]

RESULTS

Results of bivariate analyses (Table 2) reveal that all child, and most maternal and paternal characteristics, assessed were significantly associated with childhood behavioral or emotional problems. Worse maternal and paternal MCS scores were each associated with increased rates of these child problems, as was true for children whose mothers and fathers had PHQ-2 scores suggestive of depressive symptoms. Rates of such child problems were substantially higher when mothers had abnormal scores than when fathers had abnormal scores (eg, 15.5% of children had elevated CIS scores when their fathers had PHQ-2 scores suggestive of depressive symptoms, whereas 19.9% had such problems when their mothers had evidence of depressive symptoms). Rates of child behavioral or emotional problems did not vary by whether the father, mother, or another household member was the respondent (9.7%, 8.2%, and 8.4%, respectively; $P = .13$).

Table 3 summarizes the results of multivariate analyses. Older children, boys, and white children all had increased rates of elevated CIS scores. Although poor maternal physical health was associated with an increased risk of elevated CIS scores, no such association was found for paternal physical health. Scores suggestive of mental health problems on the MCS and scores suggestive of depressive symptoms on the PHQ-2 for both fathers and mothers were each independently associated with increased rates of children's elevated CIS scores. The adjusted odds ratio (aOR) was 1.33 (95% confidence interval [CI]: 1.10–1.62) for paternal MCS scores within 1

TABLE 2 Factors Associated With Childhood Behavioral or Emotional Problems in Bivariate Analyses, MEPS 2004–2008 ($N = 21\,993$)

	n	% of CIS ≥ 16 (Weighted)	*P*
		7.46	
Age, y			<.0001
5–11	12 197	5.55	
12–17	9796	9.73	
Gender			<.0001
Male	11 187	8.43	
Female	10 806	6.47	
Race/ethnicity			<.0001
White (non-Hispanic)	9621	8.88	
Black (non-Hispanic)	2461	6.29	
Hispanic	8139	4.24	
Asian/Pacific Islander (non-Hispanic)	1086	2.94	
Living with smoker(s)			<.0001
Yes	6607	10.15	
No	15 386	6.39	
Paternal PCS score			<.0001
Average or above average	12 541	6.31	
Within 1 SD below average	4064	8.19	
>1 SD below average	5388	9.79	
Paternal MCS score			<.0001
Average or above average	11 071	5.42	
Within 1 SD below average	5052	8.96	
>1 SD below average	5870	10.37	
Maternal PCS score			<.0001
Average or above average	13 781	6.05	
Within 1 SD below average	4758	9.75	
>1 SD below average	3097	10.70	
Maternal MCS score			<.0001
Average or above average	12 442	4.67	
Within 1 SD below average	5806	10.57	
>1 SD below average	3745	12.90	
Paternal depressive symptoms ($N = 19\,180$)[a]			<.0001
No	17 939	6.95	
Yes	1241	15.50	
Maternal depressive symptoms ($N = 20\,286$)[a]			<.0001
No	18 491	6.60	
Yes	1795	19.92	
Paternal smoking ($N = 19\,221$)[a]			.0005
Yes	4064	9.36	
No	15 157	6.89	
Maternal smoking ($N = 20\,302$)[a]			<.0001
Yes	2834	13.11	
No	17 468	6.60	
Paternal education ($N = 21\,247$)[a]			.0183
<High school degree	6411	6.91	
High school degree/GED	6470	8.61	
≥Bachelor's degree	8866	6.99	
Maternal education ($N = 21\,913$)[a]			.2281
<High school degree	6229	7.06	
High school degree/GED	6057	8.27	
≥Bachelor's degree	9627	7.18	
Responder to CIS			.1318
Father	3714	9.66	
Mother	17 019	8.24	
Other	577	8.44	

[a] Sample for bivariate analyses was based on children aged 5 to 17 years living in a 2-parent household with child CIS data and parental MCS and PCS scores. Thus, the number of subjects with information for PHQ-2 on parental depressive symptoms, as well as parental smoking status and parental education, is different from the total number of subjects used in the bivariate and multivariate analyses.

TABLE 3 Factors Independently Associated With Childhood Behavioral or Emotional Problems in Multivariate Analyses, MEPS 2004–2008

	n	aOR	95% CI
Age, y			
5–11	12 197	1.000	—
12–17	9796	1.424	1.231–1.648
Gender			
Male	11 187	1.000	—
Female	10 806	0.730	0.640–0.840
Race/ethnicity			
White (non-Hispanic)	9621	1.000	—
Black (non-Hispanic)	2461	0.736	0.558–0.969
Hispanic	8139	0.479	0.366–0.628
Asian/Pacific Islander (non-Hispanic)	1086	0.279	0.163–0.479
Living with smoker(s)			
Yes	6607	1.000	—
No	15 386	1.020	0.687–1.325
Paternal PCS score			
Average or above average	12 541	1.000	—
Within 1 SD below average	4064	1.154	0.977–1.364
>1 SD below average	5388	1.222	0.986–1.514
Paternal MCS score			
Average or above average	11 071	1.000	—
Within 1 SD below average	5052	1.333	1.097–1.621
>1 SD below average	5870	1.483	1.193–1.843
Maternal PCS score			
Average or above average	13 781	1.000	—
Within 1 SD below average	4758	1.533	1.277–1.841
>1 SD below average	3097	1.762	1.350–2.299
Maternal MCS score			
Average or above average	12 442	1.000	—
Within 1 SD below average	5806	2.150	1.786–2.588
>1 SD below average	3745	3.308	2.677–4.089
Paternal depressive symptoms ($N = 19\,180$)[a]			
No	17 939	—	—
Yes	1241	1.703	1.339–2.167
Maternal depressive symptoms ($N = 20\,286$)[a]			
No	18 491	—	—
Yes	1795	3.015	2.447–3.714
Paternal smoking ($N = 19\,221$)[a]			
Yes	4064	1.000	—
No	15 157	0.943	0.715–1.244
Maternal smoking ($N = 20\,302$)[a]			
Yes	2834	1.000	—
No	17 468	1.564	1.213–2.016
Paternal education ($N = 21\,247$)[a]			
<High school degree	6411	1.000	—
High school degree/GED	6470	1.161	0.898–1.501
≥Bachelor's degree	8866	1.098	0.834–1.445
Maternal education ($N = 21\,913$)[a]			
<High school degree	6229	1.000	—
High school degree/GED	6057	1.104	0.841–1.451
≥Bachelor's degree	9627	1.081	0.802–1.457
Responder to CIS Questionnaire			
Father	3714	0.934	0.755–1.154
Mother	17 091	1.000	
Others	577	0.870	0.487–1.555

[a] Sample for bivariate analyses was based on children aged 5 to 17 years living in a 2-parent household with child CIS data, and parental MCS and PCS scores. Thus, the number of subjects with information for PHQ-2 on parental depressive symptoms, as well as parental smoking status and parental education, is different from the total number of subjects used in bivariate and multivariate analyses.

SD below average and 1.48 (95% CI: 1.19–2.84) for scores >1 SD below average. For mothers, the aOR was 2.15 (95% CI: 1.79–2.59) for those with MCS scores within 1 SD below average and 3.31 (95% CI: 2.68–4.09) for those with scores >1 SD below average. Similarly, the aOR for elevated CIS scores associated with elevated paternal PHQ-2 scores was 1.70 (95% CI: 1.34–2.17), and for mothers, the aOR was 3.02 (95% CI: 2.48–3.72). Of note, as was true for the results of bivariate analyses, risks for child emotional or behavioral problems did not vary by whether the respondent was the mother, father, or another household member.

Not shown in tabular form are analyses of the subset of the sample (12 671 children and their mothers and fathers) that included data about family income, which are available in MEPS only from 2007 until the present, to allow for investigation of the possible independent association of paternal mental health problems and depressive symptoms and child emotional or behavioral problems among those living in poverty. Lower paternal MCS scores were still significantly associated with increased rates of elevated child CIS scores, as were PHQ-2 scores suggestive of paternal depressive symptoms.

Also not shown in tables are results demonstrating that, among children with fathers who had abnormal MCS scores, those aged 12 to 17 years had higher rates than those aged 5 to 11 years (12.14% vs 7.63%; $P < .0001$); boys had higher rates than girls (11.18% vs 8.21%; $P < .0001$); and white non-Hispanic children (11.64%) had higher rates than black non-Hispanic (7.88%), Hispanic (5.38%), and Asian/Pacific Islander children (4.48%) ($P < .0001$) of elevated CIS scores.

Figures 1 and 2 illustrate the relationship between rates of child emotional and behavioral problems and having no parent, a father, a mother, or both a mother and a father with abnormal MCS scores and PHQ-2 scores, respectively, suggestive of depressive symp-

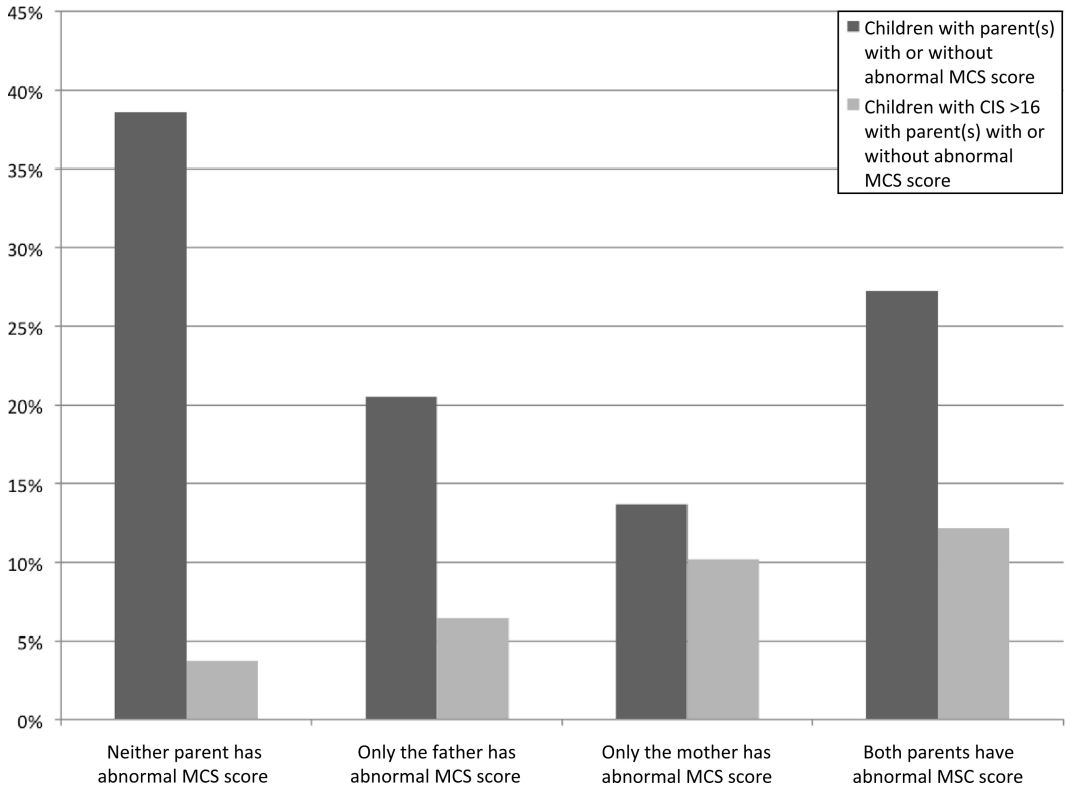

FIGURE 1
Childhood emotional or behavioral problems when parents have decreased MCS scores.

toms. Thirty-nine percent had neither a father nor mother with an abnormal MCS score, 21% had a father alone with an abnormal MCS score, 14% had a mother alone with an abnormal MCS score, and in 27% of cases both the mother and father had abnormal MCS scores. For each such category, it also shows the percentage of children with elevated scores on the CIS: 4% if neither parent scores abnormally on the MCS, 6% if the father alone had an abnormal score, 10% if the mother alone had an abnormal score, and 12% if both mother and father had abnormal scores. Figure 2 illustrates that 89% of children had neither a mother nor a father with a score suggestive of depressive symptoms on the PHQ 2; 3% had fathers and 5% have mothers with such scores; and ~2% lived in homes with both mothers and fathers with scores suggestive of depressive symptoms. Elevated CIS scores were found in 6% of children with neither a mother nor a father with scores suggestive of depressive symptoms, 11% if the father alone had such scores, 19% if the mother alone had such scores, and 25% if both the mother and the father had scores suggestive of depressive symptoms on the PHQ-2.

DISCUSSION

This study, from a sample of ~22 000 children and their mothers and fathers representative of the entire US population, demonstrates that living with fathers with depressive symptoms and other mental health problems is independently associated with increased rates of emotional or behavioral problems among school-aged children and adolescents. The findings also indicate that the risks of child emotional or behavioral problems are much greater if mothers, rather than fathers, have such problems. Paternal mental health problems are independently associated with a 33% to 70% increased risk, depending on how assessed, whereas maternal mental health problems are associated with a 50% to 350% increased risk. Most striking, we believe, is the increase in child emotional or behavioral problems when both parents have such problems, with 25% of children living in such homes having behavioral or emotional problems.

These findings are especially concerning given how common adult mental health problems are, with lifetime prevalence rates of 17% in women and 9% in men for major depression.[42] Among men, rates of depression have been found to be highest among those who are single, socially isolated, unemployed, have early-onset anxiety disorders, are medically ill, or display substance abuse.[43,44] A comparable literature review on risks for depression or other mental health problems

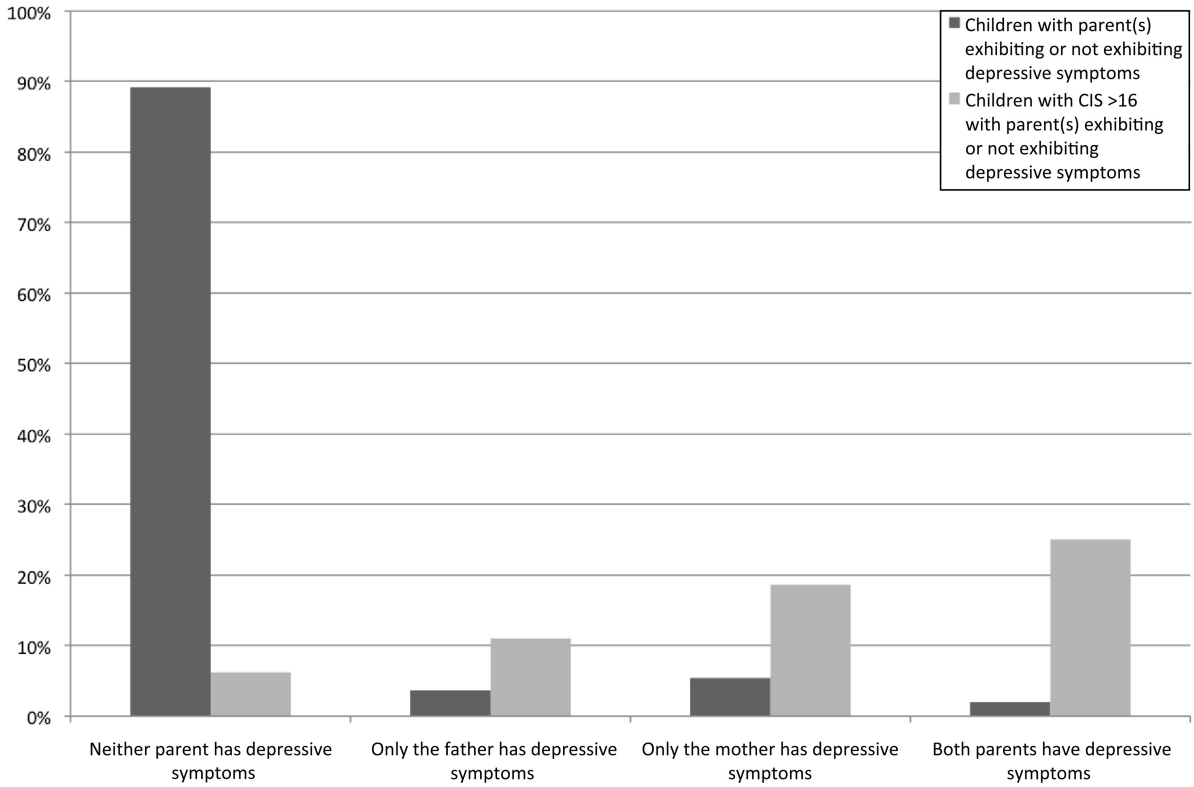

FIGURE 2
Childhood emotional or behavioral problems when parents exhibit depressive symptoms (PHQ-2 score).

among men who are fathers currently does not exist.

Several smaller studies have investigated the relationship of paternal and child mental health, and they have reported related findings among children of different ages than those in the study reported in this article.[14–21] One study found an association between paternal depression and excessive infant crying.[45] Another study found that children aged 9 to 24 months with depressed fathers are more likely to show speech and language delays,[19,21] whereas another study reported that children aged 2 years with depressed fathers tended to be less compliant with parental guidance.[17] Among children aged 4 to 6 years, paternal depression has been found to be associated with increases in problems with prosocial behaviors and peer problems.[15] Only 1 other study we are aware of was population based; it was from England and investigated related issues among much younger children,[23] demonstrating that both maternal and paternal depressive symptoms predicted increased child mood and emotional problems at 6 and 24 months of age.

A number of studies suggest increased rates of depression among children of both mothers and fathers, as well as grandparents, with major depressive disorders,[29] with virtually all using small sample sizes. A recent meta-analysis of data from 28 studies revealed that paternal depression is associated with a significant decrease in positive paternal parenting practices, which may serve as a mechanism by which depression is transmitted between generations.[46] As noted elsewhere, the literature is much more extensive regarding the effects of maternal depression than of paternal depression, and suggests that emotional disorders can be transmitted via the father or the mother to the offspring, but similar to the findings reported in the present study, the risk is much greater when mothers experience depression.

There are, of course, limitations to this study. The cross-sectional nature of these data limits the ability to infer causal relations. In fact, it is possible that child emotional or behavioral problems lead to paternal and/or maternal mental health problems, although the literature on maternal depression and other aspects of maternal mental health clearly indicate that in most such cases it is maternal mental health that influences child mental health.[1–12] Large sample sizes such as the 1 in this study sometimes result in statistically significant findings that may not be clinically significant, although this does not seem to be the case in this study, as paternal

mental health problems or depressive symptoms were associated with considerably increased risks of child emotional or behavioral problems. Only 1 member per household answered questions pertaining to all household members, and this action may have influenced the validity of the findings. Rates of child emotional or behavioral problems, however, did not vary according to whether the reporter was the mother or the father. Also, these data apply only to children living in households in which both a mother and a father are present, and cannot be applied to the large number of situations in which fathers or mothers are not living in the home with the child.

Because the CIS is a global measure of impairment, these data cannot be used to investigate particular aspects of child emotional or behavioral problems, such as depression or anxiety, and how they may vary by paternal mental health status, and they apply only to children ages 5 to 17 years. Finally, it must be reiterated that although we refer to parental depressive symptoms and mental health problems, and to child emotional and behavioral problems throughout the article, the measures used to assess these constructs were screening scales not meant for clinical diagnosis.

Despite these limitations, we believe that the findings reported in this article are of substantial clinical and public health importance. A recent article in the *Journal of the American Medical Association* examined the health services organizational implications of the intergenerational transmission of depression from parents to their offspring, highlighting the idea that successful treatment of maternal depression helps alleviate depressive symptoms in their children but only once suggests that child mental health benefits "might also flow from successfully treating depressed fathers."[47] The present study demonstrates that paternal depressive symptoms and other mental health problems are also significantly associated with children's emotional or behavioral problems; this finding raises questions of great importance about how to educate the health care workforce about this, how to develop and implement strategies to facilitate identifying fathers with mental health problems, and how to develop referral systems and ways to reimburse for this vital work. There is also a clear need for research to identify mechanisms and other influences on child emotional or behavioral problems and to identify, address, and prevent them.

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