Parental Depressive Symptoms and Children's School Attendance and Emergency Department Use: A Nationally Representative Study

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Abstract

Objective—We sought to assess the association between parental depressive symptoms and school attendance and emergency department (ED) use among children with and without chronic health conditions.

Methods—Secondary analysis of the 1997–2004 National Health Interview Survey, a nationally representative survey. Parental depressive symptoms were measured by three questions assessing sadness, hopelessness, or worthlessness in the past month. Children with and without asthma or attention-deficit/hyperactivity disorder (ADHD) were identified, and their school attendance and ED visits were reported by adult household respondents. Children with information on parental depressive symptoms, health conditions, and services use were eligible. We incorporated weights available in the survey for each eligible child to reflect the complex sampling design.

Results—104,930 eligible children were identified. The point prevalence of parental depressive symptoms was low (1.8%, 95% CI 1.7–2.0), but greater among children with asthma (2.7%, 95% CI 2.4–3.0) and ADHD (3.8%, 95% CI 3.2–4.4) than among other children (1.6%, 95% CI 1.5–1.7). After adjustment for potential confounders, children whose parents reported depressive symptoms most or all of the time were more likely to report an ED visit (adjusted Incident Rate Ratio [IRR] 1.18, 95% CI 1.06–1.32) or school absence (adjusted IRR 1.36, 95% CI 1.14–1.63) than children whose parents did not. The effect of parental depressive symptoms was not modified by child health conditions.

Conclusions—Parental depressive symptoms were adversely associated with school attendance and ED use in children. These results suggest the importance of measuring depressive symptoms among adult caregivers of children.

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Keywords

Depression; Child of Impaired Parents; asthma; attention deficit disorder with hyperactivity; health services; schools

Introduction

Depressive symptoms are common among young parents.[1, 2] Up to 12% of young parents report depressive symptoms.[3–5] Women are particularly vulnerable to depression especially in the first year following the birth of a child.[5] It has been estimated that 5% to 50% of mothers of young children experience depressive symptoms at some point.[2, 6–8] The varying prevalence estimates likely reflect differences in population samples. A lower prevalence of similarly-aged men experience depression.[9] Although depression has a strong genetic component,[10–12] the stress of parenting and raising young children likely contributes to the development or recurrence of depression.[6, 8] Parental depression is considered by Bright Futures Health Supervision Guidelines as "one of the greatest risk factors for child behavioral and mental health problems".[13]

Parental depression has been shown to have a significant impact on children's health and services use.[14–16] Depressed parents are less likely to employ child safety practices such as car seats and follow routine health supervision practices such as back-to-sleep guidelines. [17] As a result, children of depressed parents demonstrate increased use of emergency department (ED) visits and hospitalizations,[18–21] and a decreased use of preventive care services including well child visits and age-appropriate immunizations.[20–23] Children of depressed parents have a greater prevalence of mental health problems and use more mental health services, including hospitalizations and psychotropic medications, than children of non-depressed parents.[2, 15, 23] It is not known if the effects of parental depression similarly impact school attendance.

Parents who have children with chronic health conditions may be particularly vulnerable to depression due to the added stress of managing a child's complex health condition.[24] It is not known whether the adverse effects on children associated with parental depression are intensified among children with chronic health conditions or are similar across children irrespective of health status. Information on the effects of parental depression on child health and educational services use and differential effects by child health condition can be important to public health officials and health care practitioners who may consider screening intervention strategies for depression among parents. Therefore, the aims of this study were two-fold: (1) to assess the association between parental depression and school attendance and emergency department (ED) use, two important child services, and (2) to test whether the association varies as a function of the presence or absence of asthma or attention-deficit/ hyperactivity disorder (ADHD), two common chronic conditions of childhood.

Methods

Data Source

The National Health Interview Survey (NHIS) is a nationally representative survey of the civilian non-institutionalized population of the U.S.[25, 26] The NHIS has been conducted annually to monitor trends in illness and disability since its introduction in 1957 by the National Center for Health Statistics and the Centers for Disease Control and Prevention. The sampling plan follows a multistage area probability design that permits the representative sampling of households. Statistical weights are available which account for the complex sampling scheme.

The NHIS consists of three components: the Family Core, the Sample Adult Core, and the Sample Child Core. Information collected in the Family Core for all family members includes information on race/ethnicity, household income, health and functional status, health insurance coverage, access and utilization of health services. For each sampled family in the NHIS, one adult and one child less than 18 years old are randomly selected for additional data collection on health status, health services, health conditions, and behavior. Data for children less than 18 years old were obtained by merging the Family Core, Sample Adult Core, and Sample Child Core using a unique family identifier. Families are only sampled once in the NHIS. This study received an exemption from review by the Institutional Review Board at the Children's Hospital of Philadelphia.

Dependent Variables

The primary dependent variables were school absences and ED visits per year. School absences were defined in the NHIS as the number of days missed from school due to illness or injury in the past twelve months. ED visits were defined in the NHIS as the number of visits made to a hospital emergency room about a child's health in the past twelve months. Adult family respondents provided information on school absences and ED visits for children.

Independent Variables

The main independent variable was symptoms of parental depression. Since NHIS did not contain a validated measure of depression, parental depressive symptoms were measured by three questions in the Sample Adult Core that queried adult respondents as to whether they felt "so sad that nothing could cheer you up", "hopeless", or "worthless" in the past 30 days. These three questions were scaled using 5-point likert responses (all the time, most of the time, some of the time, a little of the time, none of the time) and were drawn from the Kessler Index, a six-item mental health disability index.[27] These three questions were selected as a depression symptom measure, since they mapped to criteria for Major Depressive Disorder and Dysthymic Disorder from the Diagnosis and Statistical Manual of Mental Disorders, Fourth Edition Text Revision (DSM-IV-TR) and to depression questions from the Patient-Reported Outcome Measurement Information System (PROMIS), a National Institutes of Health initiative to develop a set of publicly available computerized adaptive tests for the clinical research community.[28, 29] Parental depressive symptoms were categorized as present if a subject's response to one or more of the three questions was "all the time" or "most of the time".

Attention-deficit/hyperactivity disorder (ADHD) and asthma, two of the most prevalent chronic conditions of childhood, were selected to represent chronic childhood conditions due to their reported high prevalence in community samples. ADHD and asthma were measured by questions in the Sample Child Core that queried adult respondents as to whether they had ever been told their child had ADHD or asthma. Additional variables in the analysis included child age, sex, race/ethnicity (white, black, Hispanic, Asian, Alaskan/Native American, other), family structure (one vs. two parents in household), level of maternal education (<high school, high school, >high school), family income (<100% federal poverty level, 100–200% federal poverty level, 200–400% federal poverty level, >400% federal poverty level), child health insurance status (public, private, none), and year (1997–2004).

Analysis

Children were eligible for inclusion in the analysis if caregivers reported information on parental depressive symptoms, child asthma and ADHD, and school absences and ED visits, since not all children in the NHIS had information on the presence or absence of these

variables. To obtain nationally representative data, person-level weights were used to account for the probability of selection, oversampling of Black and Hispanic households, and non-response.[25] To obtain estimates of variance, a Taylor series estimation approach, which is a method for obtaining robust variance estimators for complex survey data such as the NHIS, was implemented. Taylor series approximation is applied to the primary sampling unit totals within strata. Person-level weights, variance estimation strata, and primary sampling unit variables provided with the NHIS data were used to generate nationally representative data. All analyses were conducted using the survey module in Stata (College Station, Texas) statistical package.

Summary statistics were generated for all independent variables. The proportion with parental depressive symptoms was examined for the full sample and separately for those with ADHD, asthma, or neither of the two conditions. Mean ED visits and school absences for children with parental depressive symptoms, ADHD, asthma, and the full sample were calculated and assessed for differences in ED visits and school absences by examining whether 95% confidence intervals overlapped or not. Simple Poisson regression was used to assess the association of each independent variable with ED visits and school absences. All variables with coefficients having p-values < 0.15 were then included in a multivariate Poisson regression model. Separate models for ED visits and for school absences were fit, and coefficients were exponentiated to obtain adjusted incidence rate ratios (IRR), a measure of relative risk. Two-way interactions involving depression status with health condition (ADHD or asthma) were assessed to determine whether child chronic condition modified the association between parental depressive symptoms and child service use. Subgroup analyses in which health conditions were stratified by child age group (<6 years old, 6–12 years old, 13–18 years old) were conducted, and regression analyses were repeated among those with and without health conditions and by child age group. The unit of analysis was the child.

Results

In the 1997–2004 NHIS, 220,141 children less than 18 years old were identified across all years. Of these, 104,930 (47.7%) children were selected by the NHIS over the eight-year period for further questioning regarding child and adult health status, child services use, and health conditions, and were included in the analysis for this study. The proportion of the overall sample contributed by each year's sample was similar, ranging from 12.3% in 1997 to 12.6% in 2004.

Using the three depression questions, 1.8% (95% CI 1.7%–2.0%) of children had a parent who reported depressive symptoms all or most of the time in the past 30 days. In the overall sample of adults, 4.9% reported any of these 3 depressive symptoms all or most of the time.

A greater proportion of children had reported asthma (12.0%, 95% CI 11.7%–12.3%) or ADHD (5.3%, 95% CI 5.2%–5.5%) than reported parental depressive symptoms. However, among children with a chronic health condition, parents of children with asthma (2.7%, 95% CI 2.4%–3.0%) and ADHD (3.8%, 95% CI 3.2%–4.4%) had greater reported depressive symptoms than parents of other children (1.6%, 95% CI 1.5%–1.7%).

Children whose parents reported depressive symptoms were more likely to be younger, female, or of non-white race/ethnicity than other children (Table 1). In addition, the former were more likely to live in a single parent household, have a family income less than or equal to the Federal Poverty Level, receive Medical Assistance, or have a mother who reported less than a high school education. The prevalence of reported parental depressive symptoms was highest for Black children (3.1%, 95% CI 2.7%–3.5%), intermediate for

Hispanic children (2.5%, 95% CI 2.3%–2.8%), and lowest for White children (1.4%, 95% CI 1.2%–1.5%).

Children with ADHD, asthma, or whose parents reported depressive symptoms had a greater mean number of ED visits and school absences per year than children in the full sample (Table 2). Children with asthma, ADHD, or parental depressive symptoms incurred a greater mean number of ED visits. Similarly, children with asthma, ADHD, or parental depressive symptoms had a greater mean number of school absences than children in the full sample.

The effect of health condition on the risk of ED visits and school absences was examined using multivariate Poisson regression. Since there were no significant effects by year (p >0.05), all children in the sample were examined in the full model. Children with parental depressive symptoms, asthma, or ADHD had an increased risk of ED visits and school absences than children without these health conditions (Table 3). In particular, children with reported parental depressive symptoms all or most of the time had an 18% increased risk of an ED visit and a 36% increased risk of a school absence compared to children whose parents did not report depressive symptoms all or most of the time. Children with asthma or ADHD had similar increased risks for ED visits and school absence as children with parental depressive symptoms. In addition, children with characteristics suggesting lower socio-economic status (i.e. reported maternal education less than high school, family income less than 100% of the Federal Poverty Level, or receiving Medical Assistance) had greater risks for ED visits and school absences than other children. Two-way interaction terms involving parental depressive symptom status by health condition (asthma or ADHD) were fit in each model but were not significant (p>0.05). Therefore, child asthma or ADHD did not modify the risk of ED visits or school absences among children with parental depressive symptoms.

To assess the impact of parental depressive symptoms among children with and without health conditions, the sample was stratified on those with asthma and ADHD (N=16.2%) and those without either health condition (N=83.8%). The risk of an ED visit was similar in both groups (adjusted IRR 1.16 with conditions vs. 1.19 without conditions). The risk of a school absence was lower in the group with health conditions (adjusted IRR 1.22 with conditions vs. 1.43 without conditions) than the group without health conditions, but the difference in adjusted risk was not considered statistically different, since two-way interaction terms involving parental depressive symptoms and health condition were not significant in the full model.

To assess the impact of parental depressive symptoms by child age, the sample was also stratified into approximate tertiles by child age group (<6 years old, 6–12 years old, and >12 years old). The mean number of ED visits was greatest in preschool aged children (0.40 visits/yr vs. 0.26 visits/yr and 0.29 visits/yr) than children in the two older age groups. The effect of parental depressive symptoms on ED visits was not significant among preschool aged (adjusted IRR 0.99, 95% CI 0.82–1.20) and school-aged children (adjusted IRR 1.24, 95% CI 1.00–1.53) but was significant for adolescents (adjusted IRR 1.39, 95% CI 1.15–1.68). The mean number of school absences was greater for adolescents (4.05 days/yr vs. 3.48 days/yr) than school-aged children. The effect of parental depressive symptoms on school absences was not significant for school-age children (adjusted IRR 1.09, 95% CI 0.95–1.26) but again was significant for adolescents (adjusted IRR 1.56, 95% CI 1.17–2.09).

Discussion

In this nationally representative sample, children whose parents reported depressive symptoms all or most of the time were more likely to incur an ED visit and school absence

than children whose parents did not. This risk was similar to that of children with two common health conditions, asthma and ADHD. Although children with asthma and ADHD were more likely to have a parent report depressive symptoms all or most of the time than other children, their risk of ED visits or school absences associated with parental depressive symptoms was not different from other children whose parents similarly reported depressive symptoms. This suggests an independent association between parental depressive symptoms and child health and educational services use.

To our knowledge, this is the first study to document that parental depressive symptoms are negatively associated with school attendance. We found that children whose parents reported depressive symptoms all or most of the time in the past month had an increased risk of school absences, similar to that for asthma and ADHD. This finding held up after adjustment for many potential confounding factors that could lead to school absence such as poverty, single parent household, and low maternal education level. The mechanism whereby parental depressive symptoms may be associated with school absences is not entirely clear. It may be that children whose parents report depressive symptoms suffer more respiratory ailments that lead to school absences.[30] It may also be that parents who suffer depressive symptoms utilize fewer pediatric preventive and health supervisory services that might avert illness and corresponding school absences.[21]

The other main finding we identified from this study was that parental depressive symptoms were negatively associated with emergency department utilization, and this finding is consistent with prior research. Mandl and colleagues reported that women whose infants made an ED visit were more likely to have depressive symptoms than those whose infants didn't make an ED visit.[19] Flynn and colleagues similarly reported that depressed mothers were more likely to bring their children to the ED than non-depressed mothers.[20] Finally, Minkovitz and colleagues found that children of depressed mothers had an increased utilization of ED visits compared to children of non-depressed mothers.[21]

We did not find evidence that parental depressive symptoms interact with child asthma or ADHD to produce more profound effects. The study results reported here suggest that parental depressive symptoms may have an independent deleterious effect on children's services use. Since children with depressed caregivers may be more likely to experience ED visits or school absences, efforts to identify and treat parental depression could in theory favorably impact children's health and educational services use. Future studies using longitudinal designs can better assess the effects of parental depressive symptoms on child services use than the present cross-sectional study design. In addition, future studies should assess the effect of parental depressive symptoms in different age groups of children, since in our subgroup analysis we found a more significant impact of parental depressive symptoms among adolescent aged children.

There are a few limitations to this study to report. First, respondents may have been misclassified with regard to depressive symptoms. The NHIS did not include a validated measure of depression, so 3 questions that are part of the Kessler Index, a mental health index, were incorporated to measure depressive symptoms. These 3 questions query respondents on symptoms of hopelessness, sadness, and worthlessness all or most of the time in the preceding month. These questions map well to DSM-IV-TR major depression and dysthymia criteria and to NIH's Patient-Reported Outcomes Measurement Information System (PROMIS) depression questions, but taken together have not been validated as a measure of depressive symptoms.[28, 29] The effect of a non-differential misclassification bias would be toward the null. Second, the point prevalence of depressive symptoms among adult respondents included in this study was low. The point prevalence of depressive symptoms among all adult respondents in the NHIS was significantly higher at 4.9% and is

consistent with other studies that report prevalence estimates of adult depression of five percent or more.[31] We speculate that the lower reported prevalence of parental depressive symptoms in our study sample may have been the result of random sampling errors among adults who were selected as household respondents for children. Third, our measures of ED visits and school absences were based on adult respondent report. It is possible that adults with depressive symptoms may over-report ED visits and/or school absences compared to non-depressed parents.[32] However, our results with respect to ED visits are consistent with the extant literature, and our results with respect to school absences are consistent with proposed mechanisms. Fourth, parental depressive symptoms and parent-reported school absences and ED visits were measured using different time frames (30 days vs. 12 months), and information on the temporal relationship was not provided in the NHIS. Therefore, these results should be interpreted to represent an association rather than cause-and-effect.

Our results from this nationally representative survey over an eight-year period suggest the importance of measuring depressive symptoms among civilian non-institutionalized adult caregivers of children across the U.S. Nationally representative surveys such as the NHIS can facilitate the measurement of depression by including validated measures of depression, for which a number of such tools already exist.[33–35] Future research examining children's services use should examine and account for parental depressive symptoms, as our results suggest it has a substantial impact on children's services use. In addition, longitudinal studies measuring parental depressive symptoms with validated tools can confirm the association found in this study regarding child health and educational services use and suggest mechanisms that can be targeted for intervention.

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Table 1

Demographic characteristics of the sample by health condition [*]

Characteristic	Asthma N=12.0%	ADHD N=5.3%	Parental Depression N=1.8%	Full Sample N=100%
Mean Age (SE) [†]	9.8 (0.05)	11.6 (0.06)	9.1 (0.13)	8.5 (0.02)
Male (%) [†]	60.0	73.4	48.7	51.2
Race (%) [†]				
White	59.9	74.2	46.0	62.5
Black	19.1	13.0	24.4	14.5
Hispanic	14.6	9.5	23.0	16.8
Alaskan/Native American	1.0	0.8	1.8	0.7
Asian	2.4	0.7	1.6	3.2
Other	3.0	2.3	3.1	2.3
Single Parent Family (%) [†]	35.4	37.6	67.6	27.7
Maternal Education (%) [†]				
High School	16.0	14.5	35.8	16.9
High School	28.9	29.8	31.7	28.0
> High School	55.1	55.7	32.4	55.1
Family Income (%) [†]				
<100% FPL	19.9	17.9	50.3	16.9
100–200% FPL	21.9	21.7	29.1	21.9
200–400% FPL	32.2	34.4	15.4	33.9
>400% FPL	26.0	26.0	5.2	27.3
Insurance (%) [†]				
Public	28.8	29.7	51.9	22.9
None	8.3	8.7	17.6	10.8
Private	62.9	61.6	30.4	66.3

[*] Children in the sample 0–18 years old were weighted to reflect the complex sampling scheme of the NHIS. Children with asthma and ADHD were identified by parent report. Parental depressive symptoms were measured by questions assessing sadness, hopelessness, or worthlessness over the past 30 days among adult household members.

[†] Differences between children with parental depressive symptoms, asthma, and ADHD that were statistically significant, p<0.05, by non-overlap of 95% CI.

Table 2

Emergency Room Visits and School Days Absent by Health Condition [*]

	Asthma N=12.0%	ADHD N=5.3%	Parental Depression N=1.8%	Full Sample N=100%
Mean ER Visits/yr (SE) [†]	0.57 (0.01)	0.42 (0.02)	0.54 (0.03)	0.31 (0.01)
Mean School Absences/yr (SE) [†]	5.84 (0.11)	5.20 (0.15)	6.50 (0.46)	3.71 (0.03)

[*] Children in the sample 0–18 years old were weighted to reflect the complex sampling scheme of the NHIS. Children with asthma and ADHD were identified by parent report. Parental depression symptoms were measured by questions assessing sadness, hopelessness, or worthlessness over the past 30 days among adult household members.

[†] Differences statistically significant, $p<0.05$, by examination of non-overlap of 95% CI.

Table 3

Adjusted Incident Rate Ratios for Emergency Room Visits and School Days Absent by Health Condition and Other Variables[*]

Characteristic	ER Visits[†] IRR (95% CI)	School Days Absent[†] IRR (95% CI)
Parental depressive symptoms	1.18 (1.06, 1.32)	1.36 (1.14, 1.63)
Asthma	1.99 (1.90, 2.08)	1.66 (1.59, 1.73)
ADHD	1.25 (1.15, 1.37)	1.26 (1.18, 1.34)
Age (yrs)	0.96 (0.95, 0.97)	1.03 (1.02, 1.04)
Male gender	1.09 (1.04, 1.13)	0.90 (0.87, 0.93)
Race/ethnicity		
Black	1.01 (0.95, 1.07)	0.67 (0.62, 0.72)
Hispanic	0.83 (0.78, 0.88)	0.74 (0.70, 0.78)
Alaskan/Native American	1.20 (0.96, 1.50)	0.96 (0.75, 1.23)
Asian	0.65 (0.56, 0.76)	0.51 (0.45, 0.58)
White	reference	reference
Two-parent household	0.81 (0.77, 0.84)	0.82 (0.79, 0.86)
Maternal education status		
<High School	reference	Reference
High School	0.98 (0.92, 1.05)	0.94 (0.87, 1.00)
>High School	0.90 (0.84, 0.96)	0.92 (0.86, 0.98)
Family income category		
<100% FPL	reference	Reference
100–200% FPL	0.95 (0.89, 1.01)	0.93 (0.87, 0.99)
200–400% FPL	0.86 (0.80, 0.93)	0.88 (0.83, 0.94)
>400% FPL	0.80 (0.74, 0.87)	0.81 (0.76, 0.86)
Insurance status		
Public Insurance	Reference	Reference
No insurance	0.75 (0.70, 0.81)	0.82 (0.77, 0.88)
Private insurance	0.70 (0.66, 0.74)	0.79 (0.74, 0.84)
Year	1.00 (0.99, 1.01)	0.99 (0.98, 1.00)

[*] Children in the sample 0–18 years old were weighted to reflect the complex sampling scheme of the NHIS. Children with asthma and ADHD were identified by parent report. Parental depressive symptoms were measured by questions assessing sadness, hopelessness, or worthlessness over the past 30 days among adult household members.

[†] Multivariate poisson models for ER visits and school days absent were estimated for parental depressive symptoms, asthma, and ADHD and adjusted for age, sex, race/ethnicity, household status, maternal education status, family income category, and insurance status. Models compared individuals with given characteristic to baseline level or absence of characteristic.