ARTICLE

Associations of Early Exposure to Intimate Partner Violence and Parental Depression With Subsequent Mental Health Outcomes

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Importance: Children with known exposure to intimate partner violence (IPV) or maternal depression are at risk for negative mental health outcomes as early as preschool age. Active ongoing surveillance for these risk factors can lead to earlier mental health intervention for children.

Objective: To examine the association between parent reports of IPV and depressive symptoms within the first 3 years of a child's life with subsequent mental health conditions and psychotropic drug treatment.

Design: Prospective cohort study linking parental IPV and depression with subsequent billing and pharmacy data between November 1, 2004, and June 7, 2012.

Setting: Four pediatric clinics.

Participants: A total of 2422 children receiving care from clinics that implemented the Child Health Improvement Through Computer Automation (CHICA) system.

Main Outcome Measures: Any report of IPV and/or parental depressive symptoms from birth to age 3 years, mental health diagnoses made with *International Classification of Diseases, Ninth Revision* criteria, and any psychotropic drug treatment between ages 3 and 6 years.

Results: Fifty-eight caregivers (2.4%) reported both IPV and depressive symptoms before their children were aged 3 years, 69 (2.8%) reported IPV only, 704 (29.1%) reported depressive symptoms only, and 1591 (65.7%) reported neither exposure. Children of parents reporting both IPV and depressive symptoms were more likely to have a diagnosis of attention-deficit/hyperactivity disorder (adjusted odds ratio = 4.0; 95% CI, 1.5-10.9), even after adjusting for the child's sex, race/ethnicity, and insurance type. Children whose parents reported depressive symptoms were more likely to have been prescribed psychotropic medication (adjusted odds ratio = 1.9; 95%, CI 1.0-3.4).

Conclusions and Relevance: Exposure to both IPV and depression before age 3 years is associated with preschool-aged onset of attention-deficit/hyperactivity disorder; early exposure to parental depression is associated with being prescribed psychotropic medication. Pediatricians play a critical role in performing active, ongoing surveillance of families with these known social risk factors and providing early intervention to negate long-term sequelae.

JAMA Pediatr. 2013;167(4):341-347.
Published online February 4, 2013.
doi:10.1001/jamapediatrics.2013.780

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Approximately 1 in 4 women and 1 in 7 men report experiencing some form of intimate partner violence (IPV) during their lifetimes, with an estimated 1.5 million women being physically abused or raped by an intimate partner in the United States each year.[1-5] The Centers for Disease Control and Prevention defines IPV as "a pattern of coercive behaviors that may include repeated battering and injury, psychological abuse, sexual assault, progressive social isolation, deprivation, and intimidation."[2] Such violence increases the likelihood of long-term physical and mental health effects for victims, including depression, posttraumatic stress, substance abuse, physical ailments such as chronic pain and headaches, and lower self-esteem.[6-9]

It has been estimated that every year at least 1.5 million children witness IPV,[2-5] which has been associated with increased risk for behavioral and mental health problems.[10-13] One explanation for this may be that mothers experience impaired functioning following episodes of violence, which then affects childhood behavioral outcomes.[13,14] Exposure to IPV and parental depression together have also been linked to behavioral problems and

poor functioning in school.[15] Moreover, witnessing IPV as a child is a known risk factor for experiencing IPV and poor health in adulthood.[16] Independent of IPV-related depression, it has also been shown that exposure to any parental depression puts children at greater risk for decreased cognitive ability and increased behavioral problems.[15,17-20] These negative outcomes are true regardless of the timing of exposure to parental depression.[21-25]

These studies provide support for the idea that pediatricians should actively screen for IPV and parental depression along with other risk factors associated with poor childhood behavioral health outcomes. However, most studies examining the effects of IPV on children are drawn from high-risk samples such as families seeking assistance from battered-women's shelters or court-reported IPV.[11,26-30] Moreover, most studies examining the association between IPV and childhood behavioral health outcomes have been among school-aged children.[12,15,31,32] Far less is known about this association among preschoolers.[33] This study not only adds to existing literature showing that IPV and parental depression are associated with childhood mental health, behavioral, and social concerns but also expands on it by focusing on the manifestations of these problems in a younger and more generalizable population of preschool-aged children seen in primary care settings. This study is also distinguished by its prospective study design.

METHODS

STUDY DESIGN

This prospective cohort study followed children in 4 Indianapolis, Indiana, community health centers where families were routinely screened for IPV and depression during the course of routine primary care clinical encounters. Billing and pharmacy claims data were extracted from the Regenstrief Medical Record System and Indiana Network for Patient Care (INPC) databases. This study was approved by the Indiana University Office of Research Administration–Human Subjects.

DATA SOURCES

The Child Health Improvement Through Computer Automation (CHICA) system is a comprehensive pediatric primary care computerized clinical decision support system comprising a knowledge base of guideline rules, a repository of patient data, a tailored printing and scanning engine, and business rules that direct the communication, printing, and scanning of patient-specific documents.[34] The CHICA system, currently used in 4 primary care practices, has provided real-time decision support for more than 32 000 pediatric patients since its launch in 2004.

Data for this study were captured from the prescreener form (PSF) that parents complete in the waiting room. The functionality of CHICA has been described elsewhere,[34-37] but in brief, the PSF includes 20 health assessment questions drawn from a roster of national guidelines for preventive and long-term care that are specifically selected for inclusion based on the child's age and history.[37] The PSF is then scanned into the CHICA system by the nursing staff prior to the physician encounter.

Previous studies have demonstrated the feasibility of screening for IPV in pediatric settings, and universal screening in these settings has been shown to significantly increase the number of victims identified.[38,39] For these reasons, screening questions specific to IPV were added to CHICA's library of queries in 2004.

Outcome data for this study were obtained from the Regenstrief Medical Record System. The Regenstrief Medical Record System has supported the county hospital system since the mid 1970s and was expanded in 2004 to form the INPC.[40] As a statewide health information exchange built for the interchange of standardized and interoperable clinical data for clinical, public health, and research purposes, the INPC currently includes clinical data from 45 hospitals and the laboratories, imaging centers, pharmacies, and large-group practices tied closely to those hospital systems. The INPC also receives data from health care payers.

STUDY POPULATION

For the purposes of this study, we focused on children receiving care at clinics served by the CHICA system from November 1, 2004, to June 7, 2012. To quantify parent reports of IPV, parental depressive symptoms, and subsequent mental health diagnoses and/or psychotropic treatment, we included subjects who had at least 2 visits documented in CHICA: 1 visit falling between birth and age 36 months (3 years) to classify exposures to IPV and parental depressive symptoms, and a second visit falling between ages 37 and 72 months (6 years) to classify the outcomes of interest.

MEASURES

Intimate Partner Violence

The IPV screening questions on the PSF are the following: (1) "Has your partner kicked, hit, or slapped you?" and (2) "Do you feel safe in your home?" Both questions are asked annually for children younger than 11 years. We defined a child as having IPV exposure if there was a positive response to either question at any visit between birth and age 36 months. If no affirmative responses were captured for any visits during this time, the child was categorized as having no IPV exposure. If all visits captured in this time had no data captured, we considered the data missing.

Parental Depressive Symptoms

Initially, the depression-screening items printed on the PSF were derived from the Patient Health Questionnaire 2 (PHQ-2),[41] which measures parent report of depressed mood ("Parents often get depressed. In the past month, how often have you felt down, depressed, or hopeless?") and anhedonia ("In the past month, have you lost interest or pleasure in doing things?"). In 2010, these questions were replaced by adaptations of the 3 anxiety subscale items from the Edinburgh Postnatal Depression Scale (EPDS-3)[42]: "In the past 7 days, have you blamed yourself unnecessarily when things went wrong?"; "In the past 7 days, have you felt scared or panicky for not a very good reason?"; and "In the past 7 days, have you been anxious or worried for no good reason?" This screening tool has been shown to have high sensitivity (95%) and a negative predictive value (98%) for postpartum depression. These parental mood questions are printed by CHICA on the PSF every 90 days during the first 15 months of life. If a parent endorsed any of the surveillance items at any visit within the first 3 years of life, a child was considered to be exposed to parental depressive symptoms.

Table 1. Psychotropic Medications of Interest Examined

Medication Class	Examples of Psychotropic Drugs
Stimulants	Methylphenidate, Ritalin, Methylin, Ritalin SR, Methylin ER, Metadate ER, Ritalin LA, Metadate CD, dexmethylphenidate, Focalin, Adderall, Adderall XR, dextroamphetamine, Dexedrine, Dextrostat, Dexedrine Spansule, and Concerta
Nonstimulants	Atomoxetine/Strattera, bupropion/Wellbutrin, Wellbutrin SR, and Wellbutrin XL
α^2 Agonists	Guanfacine/Tenex, Intuniv, clonidine/Catapres, and Kapvay
Atypical antipsychotics	Risperidone/Risperdal and aripiprazole/Abilify
Sleep agents	Trazodone/Desyrel
Selective serotonin reuptake inhibitors	Fluoxetine, sertraline, citalopram, escitalopram, and paroxetine

Sociodemographic Characteristics

Child's sex, race/ethnicity, and insurance type were all obtained from the CHICA database. Insurance type was used as a proxy for socioeconomic status.

Mental Health Conditions

We identified which children in our cohort developed mental health conditions by the following *International Classification of Diseases, Ninth Revision* (*ICD-9*) diagnostic codes recorded after age 37 months: disruptive behavior disorder (312.*), attention-deficit/hyperactivity disorder (ADHD; 314.*), anxiety (300.*), depression (311.*), sleep disturbance (307.4), or adjustment disorder (309.*).

Psychotropic Drug Treatment

We identified psychotropic drug treatment by extracting prescriptions that were dispensed at hospitals and community pharmacies participating in the INPC. Psychotropic drug treatments of interest included stimulant medications, nonstimulants, α_2 agonists, atypical antipsychotics, sleep agents, and selective serotonin reuptake inhibitors. For a complete list, see **Table 1**.

STATISTICAL ANALYSIS

Bivariate analyses of parental report of IPV, parental depressive symptoms, and sociodemographic characteristics were performed using the χ^2 test. Because parental mood and IPV were significantly correlated ($P \leq .05$), we sought to determine the relative contribution of each exposure to the outcomes of interest by creating a separate early risk factor variable with the following 4 categories: IPV only, parental depressive symptoms only, both IPV and parental depressive symptoms, and none. Logistic regression models were used to assess the association between this new variable and each mental health diagnosis, adjusting for child's sex, race/ethnicity, and insurance. Additional models tested associations between the early risk factor variable and a child having been prescribed psychotropic medication. Adjusted odds ratios and 95% CIs were calculated for each model. All analyses were performed using Stata version 11 statistical software (StataCorp LP).

Table 2. Sample Characteristics

Variable	No. (%)[a] (n = 2422)
Sociodemographic	
Sex	
Male	1260 (52.0)
Female	1162 (48.0)
Race/ethnicity	
White	253 (10.5)
Black	984 (40.6)
Hispanic/Latino	1102 (45.5)
Other	83 (3.4)
Insurance type	
Commercial/private	92 (3.8)
Medicaid/public	2170 (90.3)
Uninsured/self-pay	142 (5.9)
Report of any IPV exposure before age 3 y	127 (5.2)
Any parental depressive symptoms before age 3 y	762 (31.5)
Early risk factor exposure before age 3 y	
IPV only	69 (2.8)
Parental depression only	704 (29.1)
IPV and parental depression	58 (2.4)
Neither IPV nor parental depression	1591 (65.7)
ICD-9 diagnoses at ages 3-6 y	
Attention-deficit/hyperactivity disorder	80 (3.3)
Disruptive behavior disorder	209 (8.7)
Anxiety	17 (0.7)
Depression	9 (0.4)
Sleep problems	7 (0.3)
Adjustment disorder	41 (1.7)
Any psychotropic treatment	48 (2.0)

Abbreviations: *ICD-9*, *International Classification of Diseases, Ninth Edition*; IPV, intimate partner violence.
[a] Totals vary due to missing data.

RESULTS

There were 2422 subjects in the study cohort. **Table 2** shows sample characteristics. Among the subjects, 52.0% were male. A large proportion were black (40.6%) or Hispanic/Latino (45.5%), and 10.5% were white. A majority of participants had public insurance (90.3%). By age 3 years, 58 parents (2.4%) reported IPV and depressive symptoms together, 69 (2.8%) reported IPV only, 704 (29.1%) reported depressive symptoms only, and 1591 (65.7%) reported neither.

Based on *ICD-9* administrative billing data, the rate of subsequent mental health disorder between ages 3 and 6 years varied by diagnosis: ADHD, 3.3%; disruptive behavior disorder, 8.7%; anxiety, 0.7%; depression, 0.4%; sleep problems, 0.3%; and adjustment disorder, 1.7% (Table 2). Among the children, 2.0% had been prescribed psychotropic medication based on pharmacy claims data.

Based on the Fisher exact or χ^2 test, the prevalence of ADHD after age 3 years was significantly associated with parent-reported depressive symptoms compared with no parent-reported depressive symptoms (4.5% vs 2.8%, respectively; $P \leq .03$). The prevalence of ADHD among children exposed to IPV in the first 3 years of life compared with those not exposed to IPV almost reached statistical significance (6.3% vs 3.1%, respectively; $P = .06$). Children whose parents reported de-

Table 3. Association of Intimate Partner Violence and Parental Depressive Symptoms With Mental Health Conditions Among Preschool-Aged Children[a]

Mental Health Condition	Psychosocial Exposure, AOR (95% CI)		
	IPV Only (n = 73)	Depressive Symptoms Only (n = 632)	IPV and Depressive Symptoms (n = 53)
ADHD	1.8 (0.5-6.1)	1.5 (0.9-2.5)	4.0 (1.5-10.9)[b]
DBD	1.1 (0.4-2.5)	1.1 (0.8-1.5)	1.4 (0.6-3.5)
Anxiety	. . .	0.5 (0.1-18.0)	2.3 (0.3-18.0)
Depression	. . .	1.8 (0.5-6.7)	. . .
Sleep problem	. . .	2.8 (0.6-12.7)	. . .
Adjustment disorder	. . .	1.5 (0.8-3.0)	2.6 (0.6-11.2)
Any psychotropic treatment	1.9 (0.4-8.8)	1.9 (1.0-3.4)[b]	2.6 (0.6-11.5)

Abbreviations: ADHD, attention-deficit/hyperactivity disorder; AOR, adjusted odds ratio; DBD, disruptive behavior disorder; IPV, intimate partner violence; ellipses, not applicable.
[a] Multivariable logistic regression with robust estimates, adjusting for sex, race/ethnicity, and insurance type.
[b] Variable achieved statistical significance.

Table 4. Prevalence of Psychotropic Medication Prescriptions for Preschool-Aged Children With Mental Health Conditions

ICD-9 Mental Health Condition	Psychotropic Medication, No. (%)	
	Yes	No
ADHD (n = 80)	40 (50.0)	40 (50.0)
DBD (n = 209)	34 (16.3)	175 (83.7)
Anxiety (n = 17)	3 (17.6)	14 (82.4)
Depression (n = 9)	3 (33.3)	6 (66.7)
Sleep problems (n = 7)	1 (14.3)	6 (85.7)
Adjustment disorder (n = 41)	9 (22.0)	32 (78.0)

Abbreviations: ADHD, attention-deficit/hyperactivity disorder; DBD, disruptive behavior disorder; *ICD-9, International Classification of Diseases, Ninth Edition.*

pressive symptoms had a higher likelihood of receiving psychotropic medication compared with those with no parent-reported depressive symptoms (2.9% vs 1.6%, respectively; $P \leq .03$).

Results of multivariable logistic regression revealed significant associations between the combination of parental IPV and depressive symptoms and preschool-aged onset of ADHD (adjusted odds ratio = 4.0; 95% CI, 1.5-10.9) after adjusting for child's sex, race/ethnicity, and insurance type. Additionally, parental depressive symptoms before age 3 years were associated with a child having been prescribed psychotropic medication after age 3 years (adjusted odds ratio = 1.9; 95% CI, 1.0-3.4). Multivariable logistic regression models for other mental health diagnoses in preschool-aged children were not statistically significant (**Table 3**).

For the subset of children exposed to parental depression and prescribed a psychotropic medication (n = 20), 15 of 20 prescriptions (75.0%) were for ADHD. The other medications prescribed were selective serotonin reuptake inhibitors. Other than for ADHD, most preschool-aged children with mental health conditions were not routinely prescribed psychotropic medication (**Table 4**).

COMMENT

In this study of 2422 children, 5.2% of parents reported IPV and 31.5% reported depressive symptoms at least once during routine pediatric visits within the first 3 years of a child's life; 2.4% of the sample reported both. Children whose parents reported both IPV and parental depressive symptoms before age 3 years were more likely to be diagnosed as having ADHD after age 3 years compared with children who were not exposed to either IPV or parental depressive symptoms, and children whose parents reported depressive symptoms only were more likely to later be prescribed psychotropic medication compared with children without exposure to IPV or parental depressive symptoms, even after adjusting for sex, race/ethnicity, and insurance type.

Our study supports existing literature finding that IPV exposure is associated with significant childhood mental health and behavioral concerns.[11,43-45] However, to our knowledge, ours is the first prospective study within a pediatric clinical setting. Moreover, our study is one of the first to examine associations of IPV exposure and parental depression with behavioral health outcomes among preschool-aged children. In our sample, exposure to both IPV and parental depression before age 3 years was associated with preschool-aged onset of ADHD. This study contributes to a growing body of evidence that social risk factors can negatively affect children's functioning, which can lead to alterations in their stress response systems and put them at greater risk for negative health outcomes as they age.[15,21,46-48] It also supports the trend toward identifying ADHD in the preschool years and highlighting the pediatrician's important role in this early identification.[49] In our study, preschool-aged children exposed to a parent who reported depressive symptoms within the first 3 years of life were more likely to have been prescribed psychotropic drug treatment, especially stimulants. However, unless diagnosed as having ADHD, most preschool-aged children with mental health conditions were not prescribed psychotropic medication.

Pediatricians play a critical role in providing continuous care for families, performing surveillance of devel-

opment and behavior, and addressing academic and health issues as children enter school.[12,50] Children in families reporting IPV, past or present, should be screened for mental health conditions and monitored over time for behavioral concerns and poor functioning. Our study supports the findings that the presence of both IPV and parental depression increase the risk of poor functioning among elementary school–aged children[15] but demonstrates that significant effects can occur in children as young as 3 years.

The prevalence of IPV in our sample was 5.2%, similar to other studies in pediatric settings.[39,51-53] A variety of methods are effective for eliciting sensitive health risks such as IPV.[54] In our study, parents may have left the IPV screening questions blank for a number of reasons. Mothers may fear for their own safety and the safety of their children should disclosure of IPV become known to the perpetrator.[55] However, poor literacy or insufficient time may also have caused nonresponses. Nonetheless, active surveillance of IPV and parental depression by primary care pediatricians allows for early intervention efforts within the medical home, which may ultimately help prevent subsequent mental health issues.

Another important feature that distinguishes this study from previous research in the field is the sample population from which the subjects were drawn. Whereas previous studies drew primarily from battered-women's shelters or populations of dependent children whose mothers were victims of police-reported or court-reported IPV, this study drew prospectively from the general population of children whose caregivers screened positive for IPV in 1 of 4 community pediatric practice sites. Moreover, we collected data within 1 cohort, thereby reducing the risk of bias that is often present in case-control designs. Unlike cross-sectional studies, which only describe 1 point in time, our approach shows the temporal relationship between early IPV and parental depressive symptoms and later mental health problems in preschool-aged children.

Lastly, we elected to use administrative *ICD-9* billing data to classify behavioral health outcomes of interest. While this data source has some limitations, coding errors tend to be random and are unlikely to create a bias in our study. It is known that depressed mothers, with or without concurrent IPV, often have more concerns regarding their children's behavior.[56,57] Social desirability and recall bias are therefore more likely to bias studies relying on parent report of child behavior, especially if the reporting parent has a known history of IPV or depression.[58]

As with all studies, there are limitations that should be considered when interpreting our results. Because our study was observational, we may not have been able to account for all possible confounders such as concurrent child abuse. We did make every effort, however, to control for the most salient confounders by adjusting for sociodemographic characteristics, IPV, and parental depressive symptoms. Also, our characterization of IPV exposure was only loosely based on validated surveillance questions adapted from the Partner Violence Screen.[59] The surveillance item of feeling safe at home may have low specificity in detecting IPV.[60] However, asking whether a parent has been kicked, hit, or slapped by a partner is correlated with IPV and has been used alone or as part of a brief screener suitable for primary care.[51,61] We elected to include both items on the CHICA PSF. Based on previous work, we know that when the 2 IPV surveillance items are printed on the PSF, parents will respond to those items 88.1% of the time.[36] In addition, there is evidence that mothers may prefer the use of indirect or general screening questions when children are present.[62,63]

The method of capturing parental depressive symptoms changed during the study from the PHQ-2 to the EPDS-3. While using the PHQ-2 to detect depression in primary care settings is valid,[41] surveillance items in CHICA were changed to the EPDS-3 because the EPDS-3 was validated for postpartum depression.[42] Moreover, scores from the EPDS-3 or the PHQ-9, from which the PHQ-2 is derived, are often concordant when using either instrument to screen for major depressive disorder in the clinical care setting.[64]

Pediatricians should increase their efforts to screen children younger than 3 years preferentially for the possibility of exposure to IPV and other social risk factors whenever a parent or teacher raises behavioral concerns.[51,65] Should early exposure to IPV and/or parental depression be identified, pediatricians can perform active surveillance at each subsequent visit for emerging behavioral issues and maternal-child interaction problems related to impaired maternal functioning. In addition, treatments aimed at ameliorating parental depression symptoms can lead to reductions in child behavioral problems and should be part of the treatment plan for children with behavioral or mental health disorders.[66] Early identification of family psychosocial risk factors may ultimately translate into improved mental health outcomes for children.[67]

CONCLUSIONS

Children whose parents report IPV and depressive symptoms before age 3 years are at increased risk for the development of preschool-aged onset of ADHD, and those whose parents report depressive symptoms only are more likely to be prescribed psychotropic medications in their preschool years. Pediatricians play a critical role in performing active, ongoing surveillance of families with these known social risk factors and providing early intervention to negate long-term sequelae.

Accepted for Publication: June 26, 2012.
Published Online: February 4, 2013. doi:10.1001/jamapediatrics.2013.780
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Author Contributions: *Study concept and design:* Bauer, Carroll, and Downs. *Acquisition of data:* Bauer, Carroll, and Downs. *Analysis and interpretation of data:* Bauer, Gilbert, Carroll, and Downs. *Drafting of the manuscript:* Bauer, Gilbert, and Downs. *Critical revision of the manuscript for*

important intellectual content: Bauer, Gilbert, Carroll, and Downs. *Statistical analysis:* Bauer, Gilbert, Carroll, and Downs. *Obtained funding:* Downs. *Administrative, technical, and material support:* Bauer and Carroll. *Study supervision:* Downs.

Conflict of Interest Disclosures: None reported.

Funding/Support: This work was supported by grants 1R01HS018453 and R01 HS017939 from the Agency for Healthcare Research and Quality and R01 LM010031 from the National Library of Medicine.

Additional Contributions: The Child Health Informatics Research and Development Lab provided data from the CHICA system, and Marc Rosenman, MD, Jane Wang, PhD, and Roberta Ambuehl, BA, of the Regenstrief Institute assisted with the extraction of outcome data used in this study.

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