

## The Effect of Violence on Asthma: Are Our Children Facing a Double-edged Sword?

Jennifer Walker · Cassia Lewis-Land ·  
Joan Kub · Mona Tsoukleris · Arlene Butz

Published online: 26 June 2008  
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**Abstract** Low income, urban children with asthma are experiencing community violence that may contribute to asthma morbidity. The objective of this study was to examine the relationship between caregiver report of feeling unsafe, seeing community violence or child seeing community violence and asthma morbidity and health care utilization. Two hundred thirty-one caregivers of children with asthma enrolled in an asthma education, intervention reported perceptions of safety and violence exposure in six months and frequency of child asthma symptoms, emergency department (ED), primary care (PCP) visits and hospitalizations over 12 months. Children were primarily male (93%), black (61%), and reported income <\$30,000 (56%). Violence exposure was high: feeling unsafe (25%), seeing violence themselves (22%), child saw violence (14%). If caregivers or children saw violence, there were significantly more nighttime symptoms than those who were not exposed (caregiver: yes violence =  $6.72 \pm 9.19$ , no violence =  $4.23 \pm 6.98$ ,  $P = 0.03$ ; child: yes violence =  $7.09 \pm 7.15$ , no violence =  $4.37 \pm 9.49$ ,  $P = 0.05$ ). Children who saw violence were less likely to see their PCP. Families exposed to community violence report more asthma symptoms, but are less likely to seek care for

asthma. Health care providers and asthma educators should evaluate potential violence exposure with asthma patients and tailor care and education to include violence prevention and avoidance.

**Keywords** Community violence · Asthma · Inner-city · African Americans

### Introduction

Violence and asthma are both leading causes of morbidity and mortality in children that pose significant public health challenges due to their varying levels of severity. In 2004, more than 750,000 people ages 10–24 were treated in emergency departments (ED) for injuries related to violence; similarly 198,000 children ages 0–17 were treated in the ED for asthma that same year [1]. In 2003, over five thousand young people in the same age group were murdered, an average of 15 per day [2]. Fewer children die from asthma than violence, but in 2003, 195 children died from asthma [1]. Although these statistics are staggering, minority and impoverished populations are more disproportionately affected by mortality and morbidity associated with violence and asthma.

For African Americans, ages 10–24, homicide is the leading cause of death [2]. This same population is also 200% more likely to die due to asthma and 240% more likely to be hospitalized for asthma than whites [1]. In particular, children in urban areas are increasingly experiencing community violence [3]. Living in violent neighborhoods is associated with constant fear and the perceived threat of violence [4]. It is also associated with stress and depression in children [5].

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J. Walker (✉) · C. Lewis-Land · A. Butz  
Department of Pediatrics, School of Medicine, Johns Hopkins  
University, 200 N. Wolfe St., Baltimore, MD 21287, USA  
e-mail: jwalker@jhsph.edu

J. Kub  
Johns Hopkins School of Nursing, 525 N. Wolfe St., Baltimore,  
MD 21205, USA

M. Tsoukleris  
University of Maryland School of Pharmacy, 20 N. Pine St.,  
Baltimore, MD 21201, USA

Independent of one another, the effects of violence and asthma are astounding, but together these two leading causes of morbidity and mortality increase the likelihood that those affected will have an even greater health burden. Swahn and Bossarte noted that for children ages 5–12 years living in an urban setting, violence exposure was linked to asthma morbidity [6]. For these children, an increased exposure to violence was associated with a higher number of asthma symptom days. In particular, increased risk for wheezing was associated with a child experiencing a violent life event.

Parental exposure to violence has also been associated with asthma outcomes of children. Berz et al. found in a cohort of 2–3 year old children, that parental exposure to violence was associated with an increased risk of asthma diagnosis [7]. Although the mechanisms to explain these relationships are not always understood, one suggestion is that violence may impede proper asthma management by inhibiting a family from traveling to a doctor's office or pharmacy to fill asthma medications anytime of the day or night to seek proper treatment.

The purpose of this study is to examine the relationship between caregiver self report of seeing violence, feeling unsafe or a child witnessing violence and asthma morbidity and management, including the child's utilization and access to healthcare.

## Methods

### Overview of Study

Two hundred and thirty-one, urban caregivers and children ages 5–12 with asthma are enrolled in an ongoing randomized asthma clinical trial of an educational intervention. The overall trial is aimed at testing the effectiveness of an asthma communication, education intervention on reducing emergency room utilization of urban children with asthma. Participants are being followed for two years. Measures of asthma severity, access to medical care, satisfaction with medical care, and violence exposure are measured using structured telephone questionnaires at four time points with a six-month interval between each measurement. Participants were randomized into two groups, one receiving basic asthma education and the other receiving asthma education coupled with communication education.

### Child's Asthma Severity

Caregivers were interviewed using a structured questionnaire at baseline and six months after entry into the study. Asthma severity was measured using parent report of child

day and night asthma symptoms over the past 30 days, activity limitation and medication use applying criteria developed by the NIH [8]. In addition, parents were interviewed regarding asthma medicine used, hospitalizations and emergency department (ED) visits occurring over a six month recall period.

### Violence Variables

Community violence exposure was assessed during the initial interview and again at the 6 month follow-up data point. Caregivers were asked "In the last 6 months, did anything happen in your neighborhood that made you feel unsafe?" More specific questions followed about experiencing violence. Caregivers were asked "In the last 6 months, did you see violence such as street fighting, gang fights, shooting, stabbings, or other violence? "If the answer was yes, they were asked to specify the type of violence that they saw. A positive response to the caregiver seeing violence or feeling unsafe, was coded as violence exposure. Caregivers were then asked if their child saw violence.

Caregivers were also asked, "In the last week, did you feel worried or concerned about being overprotective of your child? "Responses were on a 7 point Likert scale of "very, very worried/concerned" to "not worried or concerned".

### Access to Care Variables

Access to care issues included ease of traveling to the PCP's office and the number of appointments with the child's PCP attended in the last six months for routine check-ups and for asthma treatment. Ease of traveling to the PCP was measured by asking, "Is it easy for you to travel to Dr. name? "Parents could respond on a 5 point Likert scale of "never, sometimes, often, almost always or always" .

### Theoretical Framework

This study used the Self Regulation Model of Disease Management [9], derived from the social learning theory, which allows an individual to be self-regulating concerning their health in order to achieve their desired health end point. The child health ends points for this study included the child reaching his/her personal goals, such as playing football or dancing, without asthma interference, optimal lung functioning, increase use of primary care and a positive change in quality of life status.

The individual goes through a dynamic 3 step process of making judgments, observations and reactions. For our study, in the judgment phase parents are taught to adjust

their child's asthma medications, with primary care input, according to the child's symptoms and environmental exposure. They do this by making observations of changes in the child's symptoms and by noting warning signs of an asthma attack. In the reaction stage the asthma educator or primary care providers assess the parent's self efficacy to react to managing their child's asthma and any other internal or external factors, such as violence, that are inhibiting proper management. The health care providers then work with the parent to develop a tailored plan to address these concerns.

### Analysis

All data analysis was done using SAS V.8.0 and STATA V.7.0 statistical package software [10, 11]. Data analyzed included baseline and 6 month data. Exposure to violence was compared with categorical variables, such as ED, hospitalizations, medication usage and violence exposure using Chi square test; T-test were used to measure continuous variables such as day and night symptoms. Significance was set at  $P < 0.05$ .

## Results

### Demographics and General Community Violence Exposure

Two hundred and thirty-one children with asthma and their caregivers are enrolled in this study. Most child participants were African American (93%) males (61%). Mean child age is 8.4 years old. Most caregivers were birth mothers (87%) with a high school education or less (70%). At baseline, most caregivers were employed (55%) with a median yearly income of at least \$30,000 (56%). Caregivers reported that they felt unsafe at baseline (25%), and 6 months (20%).

Exposure to violence over the prior six months was reported by 22% at baseline and 17% at six months. Caregivers reported that 14% of children at baseline and 9% of children at six months saw violence. At baseline, the most prevalent violent act that both parents and children witnessed was a fighting according to parent report (Table 1). At baseline, 49% of caregivers who witnessed violence reported being fairly to very, very overprotective of their child. This decreased slightly at 6 months to 39% reporting being fairly to very, very overprotective of their child.

### Asthma Severity and Violence Exposure

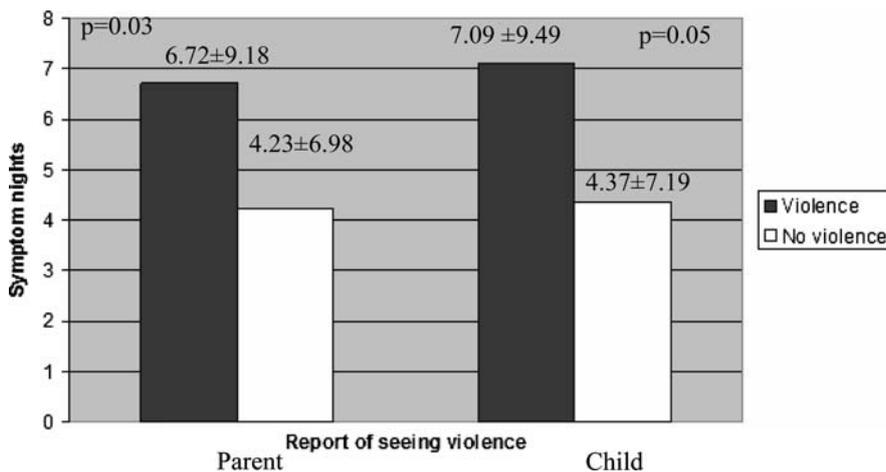
Most children in the study had mild persistent asthma at both baseline and six month time points (46% and 62%, respectively). Children who saw violence or whose caregivers saw violence or felt unsafe reported more day and night symptoms at both baseline and six months than those who did not witness violence. At baseline, children whose caregivers saw violence experienced more day and night symptoms (day:  $7.33 \pm 8.62$ ; night:  $6.72 \pm 9.18$ ) than those whose caregivers did not see violence (day:  $5.85 \pm 7.99$ ; night:  $4.23 \pm 6.98$ ). However, there was no significant difference between groups for day symptoms; only the association between night symptoms and caregiver seeing violence was significant at  $P = 0.03$  (Fig. 1).

Children whose caregivers reported that the child saw violence also experienced more day and night symptoms (day:  $7.60 \pm 8.62$ ; night:  $7.09 \pm 9.49$ ) than children who did not see violence (day:  $5.90 \pm 8.05$ ; night:  $4.37 \pm 7.19$ ). However, only the association of night symptoms and children seeing violence was significant at  $P = 0.05$  (Fig. 1). There was no statistical significance in day symptoms for children whose caregivers reported feeling unsafe and those who did not report feeling unsafe (unsafe:  $7.10 \pm 8.08$  symptom days; safe:  $5.819 \pm 8.12$  symptom days).

**Table 1** Violence exposure and type

	Caregivers baseline ( <i>N</i> = 231)	Caregivers 6 month ( <i>N</i> = 191)	Child baseline ( <i>N</i> = 231)	Child 6 month ( <i>N</i> = 191)
Feel unsafe	25.11% <i>N</i> = 58	19.90% <i>N</i> = 38	N/A	N/A
Saw violence	22.08% <i>N</i> = 51	17.28% <i>N</i> = 33	14.29% <i>N</i> = 33	9.42% <i>N</i> = 18
Violent act witnessed				
Shooting	7.78%	8.88%	2.59%	2.09%
Fighting	8.22%	6.28%	8.66%	5.23%
Stabbings	0%	1.04%	0%	1.05%
Other: ex. robbery	5.65%	97.88%	3.47%	1.58%
No violence	78.35%	81.68%	85.28%	90.05%

**Fig. 1** Parent self report of seeing violence or child seeing violence and corresponding child symptom nights



**Healthcare Access and Utilization**

Most caregivers, regardless of violence exposure, reported that their child had 1 or more emergency department (ED) visits in the past six months (85%). Fewer caregivers reported child hospitalizations in the last six months (22%) as compared to ED visits. At baseline, children who saw violence averaged the same number of ED visits as children who did not see violence (violence =  $1.93 \pm 1.84$ , no violence =  $1.82 \pm 1.84$ ). At the six month time point, 90% of children who saw violence ( $N = 32$ ) had one or more ED visits in the past six months. However, this was not significant in comparison to children who did not see violence and who also had one or more ED visits in the past six months ( $N = 164$ ,  $P = 0.31$ ).

Primary care access, based on reporting ease of traveling to the doctor and frequency of primary care visits, was not significant between families (caregiver or child) seeing violence or feeling unsafe and families that did not see violence or who felt safe ( $P = .44$ ). At baseline, only 5% ( $N = 13$ ) of those who saw violence reported never or only sometimes being able to travel to their child’s PCP. Twenty percent of those same children whose caregivers saw violence and who are not easily getting to the PCP, only used quick reliever medications per caregiver report.

Overall, most children (51%) regardless of seeing violence, attended at least 2 primary care visits within the past six months at baseline. Children at baseline and at the six months follow-up, whose caregivers reported the child saw violence or they personally felt unsafe or saw violence, had more ED visits with less corresponding PCP visits than families who did not see violence. For example, 75% of children who had 3 or more ER visits in the past six months ( $N = 12$ ) had less than 3 corresponding PCP visits in that same time period ( $N = 9$ ).

**Discussion**

Caregivers and children with asthma, who are exposed to community violence are experiencing dual barriers in achieving optimal health. The asthma experience for these families is not unlike that of their counterparts in respect to frequency of ED visits, but these families are experiencing more symptoms and are less likely to be appropriately managed by a primary care provider. Asthma guidelines suggest regular primary care provider follow-up visits at a minimum of six month intervals to monitor asthma control, and within 3 to 5 days after an emergency department (ED) visit for an acute exacerbation [8]. Asthma related PCP visits are also associated with fewer ED visits for asthma in urban children [12]. For children who experienced violence or their caregiver experienced violence or felt unsafe, there was a decrease in PCP visits as the frequency of ER visits increased, in spite of caregivers reporting that they can access care fairly easy. Caregivers need to understand that primary care visits are a necessity, especially after an ED visit, to assess the child’s asthma severity, and to develop or change the child’s asthma management plan to better control the child’s asthma [13]. Missing PCP appointments could lead to more acute asthma exacerbations and increased ED visits and hospitalizations in the future for children with asthma.

The mechanisms for understanding the inverse relationship between ED visits and PCP visits is not clearly understood, nor is the relationship between increased nighttime symptoms and experiencing violence. In this population, other moderating factors such as stress or caregiver depression due to violent conditions must be considered. These factors may be related to the lack of appropriate asthma management and control. Regardless of the mechanism, it is clear that violence has a part to play in

the inhibition of proper asthma management of children who live in violent communities.

Our study had a few limitations. All data reported at baseline and at the six month anniversary date was caregiver self report and caregivers served as a proxy for child violence exposure and frequency of child asthma symptoms. Access to care and ED visits were also self-reported and were not confirmed by medical records, as we did not have access to these files.

Despite our limitations, our research supports the fact that violence and asthma are both paramount community health issues that need further research independently and jointly. In particular, these areas should be studied for urban, minority caregivers and children who have asthma and who experience violence. They carry the dual burden of poor asthma control and feelings of insecurity due to violence. These children are not getting the full benefit of accessing primary care; instead, they are accessing the emergency department for care. Assessment of violence exposure needs to be routinely conducted during clinical encounters. PCP's and caregiver's should devise strategies to help combat any associated hindrances to asthma care, including those due to violence. PCP's and ED providers must also stress the importance of follow-up primary care visits post an acute asthma exacerbation and/or ED visit.

**Acknowledgments** Funding provided by National Institute of Nursing Research, NIH. Grant number: NR008544.

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