

Socioeconomic Factors and Home Allergen Exposure in Children With Asthma

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ABSTRACT

Introduction: The objective of this study was to determine the association between sociodemographic factors and the elimination of allergen sources from homes of asthmatic children.

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Method: In a cross-sectional analysis of data from 845 asthmatic children, multiple linear regression investigated the association between socioeconomic factors and failure to reduce allergen sources (i.e., stuffed toys, pets, carpeting, curtains, and cushions); failure to use linen covers; and not laundering linens weekly in hot water. Logistic regression assessed the relationship between socioeconomic status and exposure to environmental tobacco smoke.

Results: Mother's employment status was significantly associated with the quality of the home environment ($P = .0002$). Homemakers demonstrated fewer poor practices (3.1) compared with full-time or part-time employed mothers (3.6). Children whose mothers reported no post-secondary education were more likely to have environmental tobacco smoke exposure compared with those who had a post-secondary CE education or higher (OR 2.4, 95% CI 1.7, 3.5).

Discussion: Children whose mothers worked at home and were better educated were at reduced risk for exposure to sources of indoor allergens. *J Pediatr Health Care.* (2010) 24, 108-115.

KEY WORDS

Asthma, disease management, children, socioeconomic status, allergen, environment

Asthma is the most common chronic pediatric condition, with a prevalence of nearly 9% in the United States (Akinbami, 2006). Asthma causes significant morbidity and reduces quality of life in children and their families (Public Health Agency of Canada, 2000). A poor indoor environment aggravates asthma in children and poses a barrier to achieving asthma control. Thus, the Canadian Pediatric Asthma Consensus guidelines and the U.S. National Asthma Education and Prevention Program guidelines recommend strategies to manage asthma, including identifying allergens and engaging in behavior to reduce exposures in sensitized children (Becker et al., 2005; National Heart, Lung & Blood

Institute [NHLBI], 2007). Similarly, guidelines from Australia, Britain, and the Global Initiative for Asthma recommend environmental control practices (British Thoracic Society [BTS], 2005; Global Initiative for Asthma [GINA], 2005; National Asthma Council Australia [NACA], 2006).

Asthma prevalence is higher among children from low-income families (Crain et al., 1994; Evans, 1992; Halfon & Newacheck, 1993; Weitzman, Gortmaker, & Sobol, 1990; Wissow, Gittelsohn, Szklo, Starfield, & Mussman, 1988) and is often more severe (Erzen et al., 1997; Mielck, Reitmeir, & Wjst, 1996). Among U.S. inner-city children, the most common risk factors for asthma morbidity were household environmental exposures (Krieger, Song, Takaro, & Stout, 2000; Warman, Silver, & Wood, 2006). The home has been recognized as an important source of environmental exposures and as a target for interventions to improve asthma management (Swartz, Banasiak, & Meadows-Oliver, 2005). One study found that there were no differences in the environmental control practices among inner-city families compared with other families, despite a worse asthma status (Hansel et al., 2006). Data from the Childhood Asthma Management Program (CAMP) study found that home exposures to allergens reported by children or parents that exacerbate the child's asthma were surprisingly common (Weiss, Horner, Shapiro, & Sternberg, 2001). These findings suggest a need to raise awareness regarding the importance of reducing risks in the home environment.

Evidence suggests that children who are sensitive to dust mites benefit from home visits to counsel on allergen avoidance and asthma management (Carter, Perzanowski, Raymond, & Platts-Mills, 2001; Nishioka, Saito, Akiyama, & Yasueda, 2006). Similarly, an intervention based on behavioral and physical strategies demonstrated success in reducing exposure to airborne particulate matter in the bedrooms of low-income asthmatic children (Eggleston et al., 2005).

The literature suggests that lower socioeconomic status may be associated with greater exposure to environmental allergens. To reduce exposure, parents must engage in risk reduction behavior. While studies have surveyed parents on exposures to specific allergens such as dust and molds, few have directly examined whether parents engage in the practices needed to reduce children's exposures to allergens. In addition, few studies have examined the effect of socioeconomic status on home environment risk reduction. The primary objective of this study was to determine the association between socioeconomic factors and home environment risk reduction behavior in households with asthmatic children. A secondary objective was to determine the association between socioeconomic factors and exposure to environmental tobacco smoke (ETS).

METHODS

Study Design

Cross-sectional data from a clinical study conducted between November 2000 and March 2003 were analyzed. The data were collected from a sample of 879 children or their parents with recruitment stratified by site to represent the spectrum of asthma severity. Recruitment sites included a pediatric respiratory practice, an allergy practice, a 19-physician family practice, two outpatient hospital-based asthma clinics, and two hospital emergency departments. The inclusion criteria were boys and girls aged between 1 and 18 years residing in Ontario, Canada, with a clinical diagnosis of asthma or reactive airway disease documented in their medical record and a prescription for an anti-asthmatic medication in the previous year. This approach would enable inclusion of likely cases of persistent as well as intermittent asthma (Kozyrskyj, Mustard, & Becker, 2004). Complete records on 845 children were available and used in the analysis. Excluded records were missing data on socioeconomic status and health services use. Parents provided written informed consent and children assented. The study was approved by the Research Ethics Board of the Toronto Hospital for Sick Children.

Data

The database included information collected in face-to-face interviews using structured questionnaires with parents and with children older than 12 years regarding family demographics, socioeconomic status, home environment, exposure to ETS, drug plan access, asthma history, health services use, frequency of symptoms including cough, wheeze, and shortness of breath, and asthma medication and spacer use. The following questions regarding the home environment were included:

- "Are any furry animals or birds kept inside your home environment?" (Yes/No)
- "Does your bedroom have (check all that apply): wall-to-wall carpeting; curtains; upholstered or soft furnishings such as a soft chair; stuffed animals or stuffed toys; mattress and pillows covered in airtight covers; bed sheets and pillow cases that are washed in hot water weekly; a room located in the basement."
- "Please tell me whether the following items worsen your asthma (check all that apply): cat or other animal; pollen or ragweed; dust; air pollution; cigarette smoke; colds/sinus infections; cold air; strong smells, paints, or perfumes; weather changes; exercise; seasons (spring or late summer)."
- "Are you presently exposed to second-hand smoke on a regular basis (check all that apply): at home; in a car; at work; at school; at day care; at other peoples' homes; in public places (e.g., malls, restaurants); somewhere else."

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