

The Role of Cockroach Allergens in the Racial Disparity in Childhood Asthma Rates

INTRODUCTION

Asthma is a common respiratory disease that affects more than 22 million Americans, 7 million of whom are children.¹ Symptoms include wheezing, coughing, chest tightness, and shortness of breath. A severe episode, known as an “asthma attack,” can lead to loss of consciousness or death if inappropriately treated. However, with proper care the disease is manageable for most sufferers.

There is a conspicuous racial disparity in asthma rates in the United States, as the disease is 39% more prevalent among African Americans than European Americans.² Children living in predominately African American inner cities suffer asthma at greater rates than the general population and experience greater morbidity.³ This has lead many observers to call childhood asthma in urban environments an “epidemic.”⁴

Research has shown that cockroach allergens are a primary agent in exacerbating childhood asthma. African American children are 15.8 times more likely to be exposed to these allergens in their bedrooms

than European Americans.⁵ The policy implications of this problem deserve attention.

In this paper, I examine the research on cockroach allergens and their role in childhood asthma, with attention paid to the relevant issues of race and socioeconomic status. I conclude with policy recommendations for combating the racial disparities in childhood asthma.

ASTHMA ETIOLOGY

The exact cause of asthma is unknown, but there is strong evidence that environmental factors can help trigger the disease in those who are genetically susceptible.⁶ These factors include outdoor air pollutants; tobacco smoke; cooking emissions; mold; allergens from pets, rodents, dust mites, and cockroaches; as well as psychological stress resulting from early exposure to violence and a lack of community cohesion.⁷ Even if these factors do not actually cause asthma, they are known with certainty to increase its morbidity.

Cockroach allergens are derived from the insect’s fecal material, saliva,

dead body parts, and more, and have been shown to be particularly pernicious to asthma sufferers—more so than dust mite or pet allergens.⁸ Moreover, high quantities of cockroach allergens are one of the best predictors of asthma morbidity in children.⁹

SPATIAL DISTRIBUTION

Cohn et al.¹⁰ analyzed data from the National Survey of Lead and Allergens in Housing and found that approximately 63% of U.S. homes contain detectable levels of cockroach allergens. Living room floors were the most frequent site of detectable levels, but kitchens contained the highest levels overall. Northeastern and Midwestern homes exhibited higher living room concentrations than homes in the South or West, which tended to have higher concentrations in the kitchen.¹¹ Midwestern homes had the highest average cockroach allergen levels of any region,¹² but the cities of New York, the Bronx, and Dallas were also especially afflicted.¹³ Multiple studies have shown that inner city homes exhibit higher cockroach allergen levels than suburban homes.^{14,15,16}

STRUCTURAL DISTRIBUTION

The likelihood that a given dwelling contains cockroach allergens is correlated with its structure. Cohn et al. examined this relationship and found that high-rise apartments exhibited much higher cockroach allergen concentrations than any other form of housing.¹⁷ Eighty-four percent of high-rises had detectable levels, a rate more than twice as high as low-rise apartments, row houses, and mobile homes. Moreover, 37% of high-rises had concentrations above 8 U/g (units of allergen per gram of dust), the minimum level at which full sensitization is likely to occur; only 0.8% of detached single homes contained similar levels. Urban

housing in general was more likely to possess elevated allergen levels, as were constructions built before 1940.^{18,19}

DEMOGRAPHIC DISTRIBUTION

Sarpong et al. found that bedroom cockroach allergen exposure was 4.4 times more probable for urban children than for suburban children.²⁰ After controlling for location, the data showed that African American children were 15.8 times more likely to be exposed to the allergens than European American children. After adjusting for socioeconomic status (SES), middle-class African American children were still 11 times more likely to be exposed to the allergens than middle-class European American children.

Sensitization and skin test reactivity rates followed these trends closely. In the same study, Sarpong et al. found that urban children were four times more likely to exhibit positive skin test reactivity to cockroach allergens than suburban children.²¹ African American children were 16.4 times more likely to develop a sensitivity to the allergens than European American children. When adjusted for both race and SES, the data showed that 75% of asthmatic African American children of low SES were sensitized to the allergens.

DISCUSSION

African American children suffer from asthma morbidity more than any other group in the United States,²² and their high exposure to cockroach allergens is a significant component of this problem. Much, or even most, of the reason for this is that African American children are more likely to be poor, live in substandard housing, and reside in the inner city than European American children. However, the most puzzling aspect of the situation is that some studies

found evidence of racial disparity even after controlling for SES. The question remains as to why middle-class African American children, for instance, would be exposed and sensitized to cockroach allergen more than middle-class European American children. (It should be noted, however, that some studies did not find race to be a factor that was independent of SES.)

Genetic differences between the two races may have an effect, but the evidence points more to social and environmental factors. As Wright and Subramanian have noted, race is not a true biological characteristic in a strict scientific sense; rather, it is a more of a social construct.²³ This leaves the field open to other possible explanations that have not been as thoroughly researched. For example, obesity is suspected to contribute to the development of asthma, leading some to speculate that the higher prevalence of obesity among African Americans could help account for the disparity in childhood asthma rates.²⁴ Other researchers draw attention to the fact that African Americans smoke more than European Americans;

environmental tobacco smoke produced by parents could perhaps interact with pollutants and allergens to create a synergistic effect on childhood asthma morbidity.^{25,26}

CONCLUSION

It is clear that disentangling the role of race in childhood asthma will require more research. In the meantime, however, governments can take two simple steps to mitigate the problem of cockroach allergen exposure.

First, public health authorities should allocate more resources to pest control in inner cities and high-rise apartments, for professional extermination services have been shown to drastically reduce cockroach populations.²⁷ Second, governments should engage public service advertising campaigns or other media to educate citizens of lower SES on pest prevention and proper household cleaning techniques. McConnell et al. demonstrated the value of this when they reported a 64% reduction in cockroach allergen in homes targeted for educational intervention when compared to a control group.²⁸

END NOTES

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