Editorial

Environmental control in asthma - to recommend or not recommend: that is the question!

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There is considerable evidence that sensitization to allergens in the home, such as those derived from dust mites, cockroaches, cats, dogs and fungi, play a significant causative role in asthma. A dose-response relationship has been well established between exposure to dust mite- and cockroach-derived allergens in the home and sensitization. Exposure to elevated levels of dust mite allergen in the first year of life confers an increased risk of developing asthma before the age of 11, and the presence of this allergen in the bed has been correlated with increased asthma severity in children. In communities presenting high levels of exposure to dust mite- and cockroach-derived allergens, as do many communities in Brazil, sensitization to these elements dominates[1,2]. The combination of exposure and sensitization to cockroach allergens is a significant risk factor for seeking emergency treatment or being hospitalized for asthma. In other locales, such as in Los Alamos, New Mexico (USA), situated at 2194 m above sea level and presenting low rainfall and a dry climate, a strong correlation has been found between symptomatic bronchial hyperreactivity and sensitization to dog and cat dander. Similarly, in Tucson, Arizona, allergy to the fungus Alternaria has been shown to be a risk factor for persistent wheezing. In such locations, dust mite-derived allergens are not significant asthma-inducing factors.

Studies conducted in various cities in Brazil, including São Paulo, Ribeirão Preto, Uberlândia, Curitiba and Fortaleza, have shown considerable exposure to dust mite allergens, comparable to that observed in cities in England and Australia, as well as those on the east coast of the United States. In Brazil, mean levels of dust mite allergens, particularly those found in dust samples taken from beds, are higher than the accepted risk levels for sensitization and for the development of symptoms in sensitized individuals, and cockroach allergens are found at moderate levels. In contrast, we have observed low levels of dog and cat allergens in home dust samples[3].

Environmental control, which has the objective of minimizing exposure to allergens, remains a fundamental component of the treatment of allergic patients presenting asthma. It is a treatment strategy that can be easily implemented without adverse effects, can minimize symptoms, control bronchial hyperreactivity and reduce the need for medication[4]. Despite evidence indicating that environmental control measures are efficacious for asthma patients, some authors have been unable to demonstrate any significant effect of this treatment strategy. What could be the cause of the lack of success of these studies? Various aspects should be taken into consideration. For this strategy to succeed, the degree of sensitization must be determined on a case-by-case basis (through immediate-hypersensitivity skin tests or determination of serum levels of IgE-specific antibodies), and recommendations should be made based on the individual sensitivity profile of each patient. Environmental control requires orientation and a comprehensive plan for reducing exposure to allergens in the home. Isolated measures have a lower probability of being efficacious. For dust mites, physical approaches, including the use of impermeable pillow and mattress covers, removal of rugs and carpets, cleaning floors and furniture with a damp rag, and vacuuming frequently, have been shown to be superior to the use of acaricides such as benzyl benzoate or tannic acid. For controlling cockroaches, it is recommended that a professional exterminator be contracted, and that all rooms be treated. This should be accompanied by thorough cleaning (since cockroach allergens tend to accumulate in the home environment for several months after the insects have been exterminated). Measures intended to limit sources of food and water for cockroaches should be encouraged. Such measures include storing food in closed containers, washing dishes and taking out garbage promptly, and removing pet food and water bowls from the kitchen.

Another important aspect is the role of allergen exposure in environments other than the home. Recently, in the city of São Paulo, it was demonstrated that nurseries and daycare centers, where children nap on mattresses using blankets, both provided by the facility, are significant sources of exposure to dust mite allergens. In addition, exposure to high levels of cockroach allergen has been reported in

elementary schools[5]. Moreover, significant levels of dust mite and cat allergens have been found in public buses and taxis, which could constitute major repositories of allergens in the environment[6].

In this issue of the *Jornal Brasileiro de Pneumologia* (Brazilian Journal of Pulmonology), Melo et al., assisted by the staff of an efficient family health program recognized by UNICEF, evaluated the homes of asthmatic children and adolescents living in the city of Camaragibe, in the state of Pernambuco, Brazil[7]. In Camaragibe, approximately one-fifth of all children and adolescents present asthma. The authors determined that environmental control was adequate in 67% of the homes of children with asthma. Although no significant correlation was found between environmental control and lower frequency of asthma attacks, 77.6% of the patients studied had only 1 to 3 attacks per year. In order to fully appreciate the role of environmental control in the lives of these asthmatics, factors including symptoms during the interval between attacks, pulmonary function test results, bronchial hyperreactivity, degree of allergen exposure (especially levels of dust mite allergens in the bed and bedroom), use of impermeable pillow and mattress covers and use of asthma medication, as well as length of time between environmental orientation and the study period, should have been evaluated. However, the results of this study are significant in that they demonstrate a high rate of adherence to the "real life" guidelines given to asthmatic patients.

Alternative strategies attempting to lower the prevalence of asthma in children have focused on manipulating the environment of individuals at high risk. At the moment, six controlled studies of primary asthma prevention in children are underway, and the results related to environmental control measures have varied from country to country[8]. The longest running study is the one being conducted on the Isle of Wight, in which rigorous environmental control measures (implemented from birth) to reduce exposure to dust mites and special diets designed to prevent food sensitization have, to date, resulted in a significant reduction in wheezing, nighttime cough and symptomatic asthma, as well as less sensitization to allergens, dust mite allergens in particular, by the age of 8. Results of the Canadian Primary Prevention Study, involving infants at high risk, were published when the subjects had reached the age of 2 years and showed that intervention consisting of environmental control of dust mites, pets and passive smoking, as well as diet, brought about a reduction in asthma in comparison to a control group. Preliminary results from other cohort studies also appear promising, although longer followup will be necessary in order to draw more definitive conclusions.

In conclusion, environmental control to reduce exposure to allergens in the home is an important element of an effective treatment strategy for allergic diseases. Therefore, once sensitization has occurred, recommendations to reduce exposure to specific allergens in the environment are appropriate. The results of various studies have provided evidence of the importance of environmental control. However, strategies for optimizing measures intended to reduce allergen levels in the home and in public places need to be evaluated more extensively.

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