

ASTHMA< Observation about treatment and education of patients in San Pablo Clinic, Heredia
Costa Rica

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Introduction:

The impetus for this project stemmed from our observations of the treatment of acute and chronic asthma at the "Clínica de San Pablo de Heredia." Moreover, we noted a large proportion of the clinic patients suffer from asthma. The following discussion provides a general overview of asthma, a summary of the questionnaire posed to some of the health care providers at the clínica, and strategies to improve the effectiveness of asthma treatment.

General Overview:

"Asthmatic disease is in many countries one of the most important chronic disorders... and due [to] its chronic character proper medical treatment becomes costly resulting in a heavy burden on limited health resources. Asthma and other allergenic conditions are also a burden on the individual often impairing education, work and social life."¹

Definition and Pathophysiology

An accepted definition of asthma is "a disease of airway inflammation in which eosinophils and mast cells are prominent, producing recurrent episodes of cough and wheeze, often associated with increased bronchial hyperresponsiveness and reversible airflow limitation."² Asthma is thought to hinder the patients' respiratory status by widespread narrowing of the airways, epithelial cell sloughing, mucus and inflammatory cell accumulation, and airway wall edema.

Epidemiology

"Asthma is the most common chronic disease among pediatric patients and is the leading cause of childhood disability and school absence, causing substantial morbidity. The prevalence of asthma has increased over the last four decades."¹ In three Costa Rican studies conducted between 1989-1998, the overall prevalence of childhood asthma was 23.4%.

At the Coopesalud RI- Clínica de Pavas, a suburban health center located within San Jose, Costa Rica, 17% of the total number of urgent care visits in 1997 were related to asthma. 49 of the 3,049 patients who received emergent asthma treatment, were seen on 10 or more occasions that year, for a total of 977 visits. These statistics demonstrate the chronicity and severity of asthmatic disease as well as the strain on health care resources.

Propensity for Asthma

Congenital Anatomical and Physiologic Abnormalities

Experiments that have studied children with persistent asthma and airway responsiveness post-wheezing associated respiratory infections show that these children had preexisting abnormalities in airway structure and features of atopy such as elevated serum IgE levels and positive skin prick tests. Thus, it is now thought that those children who suffer from persistent wheezing or asthma have anatomical or physiologic abnormalities from birth.³

Genetic Susceptibility

In the search for the "asthma gene" investigators have used atopy and airway responsiveness as markers for asthma. Potential loci of atopy may be present on chromosomes 11q, 14 and 15. Note, however, that to date the only predictor of severe asthmatic disease is pre-existing eczema and a first-degree relative with atopic asthma and/or eczema.⁴

Environmental factors (house dust mites, cigarette and flowering grass exposure)

Persistent wheezing in childhood has also been associated with elevated serum IgE levels and positive skin prick tests specifically responsive to house dust mite in infancy. In two studies of *Dermatophagoides pteronyssinus* (*D.pt*) exposure, children who developed asthma by age 11 had been exposed to housedust mite at a concentration of $D\ pt\ 1 > 10$ micrograms/g of dust at age one. Further, the age of the first wheezing episode was found to be inversely proportional to the level of exposure.⁵ In a study of children born in specific months in the Rome district, a significantly higher proportion of grass and house dust mite allergy was present in those children born when these grasses were flowering and when the mites were most prevalent than in the general population.⁶ Additional studies have found that increased airway responsiveness is present in both children with a family history of asthma and a history of parental smoking.

Control of Sensitization

A window of allergic opportunity is known to exist. Thus, inhalant allergen avoidance, especially to house dust mite, cat fur, molds, and possibly cockroach antigens, appears to be effective in blocking or delaying the onset of asthma and allergies in children. Breast-feeding alone is known to reduce the prevalence wheezing and eczema. Maternal smoking has been shown to double the risk of wheezing at age 13. This deleterious response to second hand smoke is seen both during gestation and after birth.⁷

Treatment of Asthma

Note that while there is no *cure* for asthma at this time, most acute exacerbations can be avoided in asthmatics. In addition, many children who have chronic cough or wheezing in early life will not experience symptoms in later life. For that same reason, those children who are treated should be chosen carefully and those who are treated should be "weaned down" when control of symptoms has been achieved. Management strategies should be devised for each child and must address the frequency and severity of symptoms, precipitating triggers, and the age of the child. As airway hyperreactivity is thought to be less of a concern, the emphasis on treatment is now upon the delivery of anti-inflammatory treatment as opposed to relief of bronchospasm. Lastly, one should attempt education and an approach to the patient that emphasizes the power of the patient in the disease so that the child's asthma does not become a disabling or negative factor. *Goals of treatment include:*

1. rapid resolution of acute symptoms
2. control chronic symptoms
3. prevention or minimization of acute exacerbations
4. prevention of interruptions of daily activities: no sleep disturbance and prevention of exercise-induced asthma
5. normalization of pulmonary function
6. normal growth
7. avoidance the adverse effects of medications
8. environmental control where indicated by history and allergy test results
9. use of delivery devices that are appropriate to the drug and the patient's age

While this paper will not review in detail the medications used for asthma treatment, the medications employed at the San Pablo de Heredia clinic include:

- beta-adrenoceptor agonists (e.g., salbutamol)
- bronchodilator/anti-inflammatory (e.g., theophylline)
- systemic and inhaled steroids (e.g., beclomethasone, dexamethasone)

Note that Cromolyn Sodium is used in Costa Rica but is not generally prescribed at the San Pablo clinic.

San Pablo de Heredia Clinic Questionnaire

Methods:

The intent of the questionnaire was to determine the perceived importance of asthma, approach to treatment and effectiveness of treatment. The survey consisted of seven questions pertaining to education methods employed at the clinic, barriers to effective treatment and the number of asthma exacerbations treated. (Appendixes 1 and 2) The questions were posed to various health care providers, including physicians, nurses and pharmacists, during an informal interview.

Results:

At the community clinic of San Pablo de Heredia, the number of urgent care visits for asthma totalled 46 in January of 2001, 55 in February and 34 for the first 16 days of March. 2001

The perceived causes of asthma exacerbation include:

- exposures to allergens (e.g., dust mites)
- environmental pollutants (e.g., brushfire and cigarette smoke inhalation and chemical exposure in the workplace)
- improper use of medications (i.e., inadequate and misuse of medicines)
- climate change
- delayed arrival to care (i.e., presentation to clinic in severe distress vs. when symptoms first arise)

Apparent barriers to effective management include:

- time
- lack of privacy for patient education
- space (i.e., room for community education)
- lack of perceived patient interest
- potential negative feedback from community members regarding use of medications
- fear of secondary effects of medications
- quality of clinic equipment (e.g., nebulizers, lack of oxygen tanks)

Suggestions for an ideal asthma educational program include:

- quick patient response at commencement of *crisis*
- proper use of prescribed medications
- prevention of *crisis* (e.g., allergen avoidance such as minimizing the number of stuffed animals in the home)

Discussion:

In addition to the large number of urgent care asthma visits, which appear to be trending upwards, the San Pablo de Heredia health staff reports that some of these patients have returned more than once in *crisis*. The increased use of medications, supplies and staff time make urgent appointments more taxing upon clinic resources.

During the course of the interviews it was apparent that health care providers from all health care disciplines are well informed about asthma and effective measures to treat the disease. Despite the abundance of knowledgeable providers, there appeared to be a substantial disconnect with education dissemination to the patients. Undoubtedly the health care providers are under considerable constraints given the limited resources appropriated to the clinic. For example, allocating funds to a patient education specialist is unlikely to be an option at this time, nor is it possible to physically provide a private space for one-on-one educational tutorials. Nonetheless, given the wealth of knowledge and dedication of the health care providers there are potential interventions which may improve the effectiveness of care for asthma patients. Based on the questionnaire, our observations and similar experiences in the United States, we propose the following strategies:

TABLE 1
Strategies for improving care

	Problem/Barrier	Solution
Clinic issues	Funding (for educators and materials)	1. Education of the community potentially could result in decreased dependence upon emergency measures such as nebulizer administration and long-term fiscal rewards 2. pamphlet/written material distribution could decrease the number of staff hours (Appendix 3 and 4)
	Time	1. group discussions would allow more patient education than currently is provided during urgent care visits and appointments 2. as above, distribution of printed materials would require less teaching time
	Space	1. evening community meetings for asthma education 2. lack of patient privacy issues could be addressed with regular appointments for asthma monitoring
Patient issues	Medicines	<i>Technique:</i> Address at exacerbation follow-up appointments and during non-acute visits <i>Effectiveness:</i> Provide/ demonstrate spacer use at the clinic; color-label medications to represent daily/ regular use (green), medications required for mild attacks (yellow) and medications used as rescue medications (red)
	Community influence	Group education to address potential secondary effects of medication, the use of traditional medicines, and the benefits of smoking cessation

Conclusion

Asthma is a significant problem in the patient population served by the San Pablo de Heredia clinic. Fortunately, the health care providers are adequately trained to deliver effective asthma treatment. Nonetheless, several barriers prevent ideal asthma care and contribute to asthma crisis.

Many of the providers expressed frustration with the perceived major contributors to asthma exacerbation. Issues such as community-wide air pollutants and climate change may be beyond the immediate control of the physician and patient. However, the interviewees also suggested several attainable improvements.

The results of our small scale investigation highlight a need for further studies which might include the examination of:

1. environmental and home conditions of asthma patients and its contribution to asthmatic disease
2. preconceived ideas about asthma and its treatment in the community
3. the value of community wide educational projects
4. medication adherence

¹ Soto-Quiros, M. Studies of the prevalence of asthma and allergy in Costa Rican school children, Department of immunology, University of Göteborg 2000.

² Welch, M. Inhaled corticosteroids and growth in children, *Pediatric Annals*, 1998; 27: 752-758.

³ Bush, A. Asthma in the child under five, *British Journal of Hospital Medicine*, 1996 Feb 7-20, 55 (3): 110-114.

⁴ Warner, Naspitz. Consensus Statement: Asthma Management. 1995; 2-17.

⁵ Sears, Malcolm. Epidemiology of childhood asthma. *Lancet* 1997; 350: 1015-1020.

⁶ Businco, L, Cantani, A, Farinella, F and Businco, E., Month of birth and grass pollen or mite sensitization in children with respiratory allergy: a significant relationship. *Clinical Allergy* 1988; 18: 269-274.

⁷ Kattan, M. Epidemiologic evidence of increased airway reactivity in children with a history of bronchiolitis. *The Journal of Pediatrics* 1998; 135, 2(2): S8-13.