

Asthma in Developing Worlds

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INTRODUCTION

In the last decades growing evidence of a worldwide increase in atopic diseases and sensitisation to common allergens was provided. Prevalence of asthma is increasing most rapidly among children, especially where urbanisation takes place. Several risk factors that we can observe in developing countries or in inner-city communities of the developed countries contribute to asthma morbidity and mortality. Poverty, climate, exposure to tobacco, viral infection, outdoor air pollution and chemical irritants are included in the most important risk factors (1).

The results of Phase 1 of the International Study on Asthma and Allergic Diseases in Childhood (ISAAC) (2) demonstrated that prevalence of childhood asthma from most developing countries is similar to those observed in developed regions. The different realities however demanded for differentiated solutions on how to effectively and efficiently provide comprehensive asthma health care services. Moreover, asthma education and self management must be increased in developed and developing countries with different strategies because in many countries people with common Chronical Respiratory Diseases (CRD) including asthma have no access to acceptable standing of health care (3).

EPIDEMIOLOGICAL DATA

The results of Phase 1 of ISAAC indicate that the prevalence of childhood asthma varies through the world (4). The data from the 13/14 years old children studied in 155 centres from 56 countries in Europe, Asia, Oceanic, Africa, Latin and North America, show that the highest prevalence of asthma symptoms and severity in the last 12 months are in Australia and New Zealand (29,7%) and the lowest in Asia (6,6%). The key finding of the ISAAC Phase 1 is the wide variation in the prevalence symptoms related to asthma with differences ranging 20 to 60-fold between centres. The prevalence also varied according to language, racial and ethnic characteristics or inheritance as well as variation of environment and socio-economic status.

In developing countries the risk of asthma related to infection must be considered. Scrivener et al (5) showed that the high degrees of parasite infections could prevent asthma symptoms in atopic individuals in Ethiopia when

comparing populations from rural and urban areas. Addo Yobo et al. (6) in Ghana demonstrated that the prevalence of bronchospasm induced by exercise and atopy are higher in rich urban areas than in poor or rural urban areas, suggesting that in addition to genetic predisposition, social and environmental factors are important determinants of the phenotype. He also demonstrated that the sensitisation to dust mite and cockroach allergens in inner-city populations were independent risk factors for asthma in Ghanaian children (7). Celedon et al. (8) refer a relationship among markers of allergy, asthma, rhinitis and eczema in Costa Rica similar with those found in countries with a western lifestyle and different from those found in rural areas of Africa and Asia. Brazilian studies present a strong and statistically significant inverse association between skin prick response to common aeroallergens and infection with *Schistosoma mansoni* (9).

Another study in day care centres and schools of São Paulo city (10), demonstrate that even these environments play a significant role as sources of exposure to dust mites and cockroach allergens and also endotoxin. In Hong Kong (11) Leung conclude that the indoor aeroallergens are one of the risk factors for the development and severity of mild to moderate asthma in Chinese children.

The epidemiological data underline show the relevance of the risk factors in different areas and the role of protective factors as suggested by the hygiene hypothesis in the developing countries (12).

DIAGNOSIS AND TREATMENT

Diagnosis of asthma in developing countries is not a simple process. Social, financial, cultural and socio-economical barriers as well as the organisation of national health care systems in different countries make the task very difficult.

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The diagnosis starts with specific training of professionals at different levels of the health care system making it possible to identify the symptoms and to develop programs of prevention and treatment.

In what concerns treatment, GINA (13) and ARIA (14) projects are world programs in this domain. However the findings of these projects will have to be supported by national guidelines according to national realities. The cost of treatment should not be an obstruction to access to the basic drugs (salbutamol, beclomethasone, theophylline, prednisolone) in the middle and low-income countries. In these countries the education of patients play a relevant role and must be improved to obtain a better collaboration in the administration of drugs.

THE PORTUGUESE EXPERIENCE

Since 1989 an official protocol was started between the Ministry of Health from Portugal and Cape Verde in Allergology and Clinical Immunology under the coordination of the Immunoallergology Department of Dona Estefânia Hospital, Lisbon. Cape Verde Republic is since 1975 an independent country in Africa (Gulf of Guinea) with 434.812 inhabitants (2000 census) living in 9 islands; infantile mortality rate 54/1000 new-borns; live expectancy at birth 69,4 years; physicians 40/100.000 inhabitants; GIP 4490 USD per capita. The Cape Verde Health System includes 2 Central and 2 Regional Hospitals (Hospital Network) and 17 sub-unit dependences and basic sanitary units (Primary Care Systems). The prevalence of asthma in children is around 10% (15) and 5% of the children were admitted in the emergency rooms in 2002. The available outpatient facilities are: emergency room, treatment protocol, nebulizers and spacers in all the Hospitals and sub-units dependences. Spirometry is available at the outpatient consultation in the 2 Central Hospitals. The official collaboration between Portugal and Cape Verde is made through direct activities (1 or 2 per year) in the last 14 years involving physicians, health technicians and psychologists and the main targets are: a) clinical assistance and follow-up of the consultation in the 2 Central Hospitals (more than 6.000 patients) under the responsibility of two doctors trained by our Department, implementation of guidelines for asthma treatment and the offer of equipment (nebulizers, spacers and spirometers) to the health care centres and the Central Hospitals; b) educational activities - training of physicians and health technicians in the respiratory area; c) research projects - in the areas of epidemiology and laboratory (15,16,17). In 2002 the first Allergologist Specialist from Cape Verde concluded the training following a program organised according with the national reality during 3 1/2 years under the supervision and responsibility of our Department.

In the future the goals of the collaboration are: reduction of mortality and morbidity, namely asthma related, improving better individual quality of life and self-management programs in chronic respiratory diseases.

CONCLUSIONS

The prevention and treatment of asthma in developing countries must be improved. The increasing of asthma and allergic diseases in the last years in all the continents demands for a global strategy including better surveillance, prevention (primary, secondary and tertiary) and access to a low price treatment. Strong partnerships between health care national systems and other sectors (governmental and non governmental organisations) in the area of respiratory disease, as proposed by the World Health Organization, are urgently needed to provide better quality of life to these patients.

REFERENCES

1. Bousquet J, Ndiaye M, Ait-Khaled N, et al. Management of chronic respiratory and allergic diseases in developing countries. Focus on sub-Saharan Africa. *Allergy* 2003;58:265-83.
2. Vichyanond P, Weinberg E, Sole D. Childhood asthma in developing countries. In *Textbook of Pediatrics Asthma*, Ed. Charles Naspitz, Stanley Szefer, David Trikelman and John Warner; Martins Dunitz, London 2001.
3. WHO Strategy for prevention and control of chronic respiratory diseases - World Health Organization, Management of Non-communicable Diseases Department, Geneva 2002.
4. Mallol J, Clayton T, Asher I, et al. ISAAC findings in children aged 13-14 years - an overview. *ACI International* 1999;11:176-82.
5. Scrivener S, Yemaneberhan H, Zebenicus M, et al. Independent effects of intestinal parasite infection and domestic allergens exposure on risk of wheeze in Ethiopia: a nested case-control study. *Lancet* 2001;358:1493-9.
6. Addo-Yobo EO, Custovic A, Taggart SC, et al. Exercise induced bronchospasm in Ghana: differences in prevalence between urban and rural school children. *Thorax* 1997;52:161-5.
7. Addo-Yobo EO, Custovic A, Taggart SC, et al. Risk factors for asthma in urban Ghana. *J Allergy Clin Immunol* 2001;108:363-8.
8. Celedon JC, Soto-Quiros ME, Hanson LA, Weiss ST. The relationship among markers of allergy, asthma, allergic rhinitis and eczema in Costa Rica. *Pediatr Allergy Immunol* 2002;13:91-7.
9. Araujo MI, Lopes AA, Medeiros M, et al. Inverse association between skin responses to aeroallergens and *Schistosoma mansoni* infection. *Int Arch Allergy Immunol* 2000;123:145-8.
10. Rullo VE, Rizzo MC, Arruda LK, Sole D, Naspitz CK. Daycare centres and schools as sources of exposure to mites cockroach and endotoxin in the city of São Paulo, Brazil. *J Allergy Clin Immunol* 2002;110:582-8.
11. Leung TF, Lan CW, Chan IH, et al. Inhalant allergens as risk factors for the development and severity of mild to moderate asthma in Hong Kong Chinese children. *J Asthma* 2002;39:323-30.
12. Martinez FD. The coming of age of the hygiene hypothesis. *Resp Res* 2001;2:129-32.

13. Global Initiative for Asthma. Global strategy for asthma management and prevention: National Institute of Health, NHL, WHO report 1995.
14. ARIA - Allergic Rhinitis and its Impact on Asthma. *J Allergy Clin Immunol* 2001;108(Suppl.5):S174-334.
15. Morais Almeida M, Rosado Pinto J. Bronchial asthma in children: clinical and epidemiologic approach in different Portuguese speaking countries. *Pediatr Pulmonol Suppl* 1999;18: 49-53.
16. Morais Almeida M, Gaspar A, Rosado Pinto J. Epidemiology of asthma in Portugal, Cape Verde and Macau. *Pediatr Pulmonol* 2001;(Suppl.23):35-7.
17. Rosado Pinto J. ISAAC World Project: Epidemiology in Cape Verde and Madeira Islands. *J Invest Allergy Clin Immunol* 1997; 7:292-3.
18. Abreu Nogueira JM, Pinto PL, Morais Almeida M, et al. ALATOP-RIA in the screening of atopy in a non caucasian population. *Allerg Immunol* 1997;9:274-8.