Asthma in developing countries – managing an increasing burden

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Asthma is common in children in many developing countries. The most reliable information on the global prevalence of childhood asthma has come from the International Study of Asthma and Allergies in Childhood (ISAAC) studies. These studies used cross sectional questionnaires to survey the prevalence of asthma symptoms in children of two age groups (6 to 7 years and 13 to 14 years) to investigate time trends in global prevalence. ISAAC Phase 1, the initial epidemiological survey was repeated five to 10 years later as ISAAC Phase 3. In most countries surveyed, the prevalence of asthma in children aged 6 to 7 years increased, whereas the prevalence in those 13 to 14 years stabilized or decreased in many developed countries.\(^1\)\(^-\)\(^3\) In contrast, in most developing nations, the prevalence of asthma in adolescents also increased.\(^1\)\(^,\)\(^3\) Whereas the prevalence in most English speaking countries has declined, substantial increases in asthma prevalence have occurred in Latin American countries such as Costa Rica, Panama, Mexico, Argentina and Chile, Eastern European countries such as the Ukraine and Romania, some African countries like Tunisia, Morocco, Algeria and South Africa and others including Barbados, Indonesia and China.\(^3\)\(^,\)\(^4\) Thus, these results indicate that in many developing countries the prevalence of asthma in children is increasing, in contrast to that in developed populations where the prevalence has stabilised or is decreasing.\(^1\)\(^-\)\(^3\)

The large variations in the worldwide prevalence of symptoms of asthma reported even in genetically similar groups, suggest that environmental factors influence the expression and severity of asthma. The rising prevalence of asthma has been ascribed to a number of factors including a reduction in the prevalence of childhood infections, change in diet and lifestyle, economic development, and increased exposure to allergens or pollutants.\(^5\)\(^-\)\(^8\) Large differences in urban-rural prevalence rates have been reported in African children of the same genetic background.\(^9\) Yet, recent data suggests that the asthma prevalence in rural children is also increasing and that the urban-rural gradient has declined. For example, less than 30 years ago, asthma was reported to be relatively rare among Xhosa speaking South African children particularly those living in rural areas, with a 10 fold difference in the urban-rural prevalence of 3.2% and 0.1% respectively.\(^9\) Two recent studies, done in the same geographical area, found that the prevalence has risen in both urban (to more than 15%) and rural areas (to more than 8.5%), with a marked reduction in the urban-rural gradient to approximately 2.\(^10\)\(^,\)\(^11\)
While a lifestyle of affluence has been associated with a higher asthma prevalence, poverty is associated with more severe asthma, higher morbidity and an increased risk of fatal asthma. In addition, the importance of non-atopic asthma has increasingly been recognised in children in developing countries, accounting for a large proportion of children with asthma. Children with non-atopic asthma generally have an earlier onset of asthma, more frequent history of pneumonia and increased exposure to household environmental tobacco smoke compared to those with atopic asthma.

Whatever the aetiology, increasing numbers of children in developing country settings can be expected to develop asthma given the population growth and changing pattern of urbanisation and lifestyle in these countries. Furthermore, in developing country settings, children account for a greater proportion of the population compared with developed countries. In 2005, children under 15 years of age comprised approximately 31% of the total population in developing countries, compared to 17% in developed nations. Thus, even a small rise in asthma prevalence may have important public health implications in these countries.

Diagnosis of asthma in children in developing country settings poses particular challenges to health care professionals. Diagnosis is complicated by the high prevalence of tuberculosis (TB), HIV-associated lung disease and other poverty related lung conditions. Moreover, non atopic asthma may be more challenging to diagnose in young children; development of an asthma predictive index for children with wheezing relies on the associated features of atopy. Under-recognition and under-treatment of a large proportion of children with asthma is a consistent feature globally. Global surveys have confirmed unnecessary morbidity as limitation of activities, absenteeism from school, nocturnal wakening and hospitalisations due to inadequate recognition and treatment of asthma even in developed nations. In developing countries where health care systems are already overwhelmed by the HIV pandemic and infectious diseases and where health care resources are limited, under diagnosis and under treatment are even more problematic. Diagnosis in infants or children under 5 years of age may be especially difficult given the high incidence of viral respiratory infections which frequently present with wheezing and the unavailability of objective measures of lung function in young children. Yet, accumulating evidence indicates that sustained control of all clinical features of
Asthma can be achieved with adequate preventative therapy. This is reflected in recent revisions of international asthma guidelines which now advocate a control-driven approach to asthma management.

Providing effective asthma management may be particularly challenging in developing country settings. Even when the diagnosis of asthma has been made, effective treatment is frequently unaffordable and inaccessible. Inhaled therapy, the current standard of care for both prophylaxis of persistent asthma and relief of acute attacks, is frequently unavailable. A questionnaire administered in 24 countries in Africa and Asia reported that inhaled steroids were available to only 37% of respondents and prescribed in 5%; inhaled bronchodilators were available to 83% and prescribed by 29%. In contrast, oral theophylline and bronchodilators were available in almost all cases and prescribed by 73% and 85% respectively. A survey of the availability and affordability of essential asthma medicines in 8 developing countries found that these were unaccessible in most. In 80% of countries, the cost of 1 year's supply of essential drugs for treatment of a person with moderate persistent asthma, exceeded the monthly salary of a nurse in that country. Cost and availability of asthma drugs are therefore an important barrier to effective management in many developing countries. But use of inhaled corticosteroids is cost effective as shown in a paediatric study from Costa Rica. Moreover, the emergence of generic formulations and creation of an asthma drug facility by the International Union against TB and Lung Diseases, has made asthma therapy more affordable. An additional obstacle to effective inhaled therapy for children in developing countries is the lack of low cost spacer devices. However, low cost homemade devices with demonstrated efficacy, in particular a modified 500ml plastic soda bottle have been developed and can be relatively easily made and used.

Poor access to care, particularly in impoverished rural communities is an important obstacle to effective asthma management. Lack of transport, long distances to the nearest health facility and poor telecommunication facilities may further complicate management. Developing appropriate education and action plans for acute and chronic asthma in such situations is challenging. Asthma education programmes that are language and culturally appropriate to specific developing country populations need to be established. The place of traditional medicines in asthma therapy is also
worthy of consideration as such remedies are widely used in some developing
countries.

New therapies for asthma including long acting $\beta_2$ agonists, combination therapy or
leukotriene receptor antagonists have had less impact in developing countries where
access and affordability to such treatment is poor compared to that in developed
nations. A survey of the price of therapy in selected low- and middle-income
countries, reported that the cost of one month of combination treatment for asthma
ranged from 1.3 days wages in Bangladesh to 9.2 days wages in Malawi.$^{25}$

Nevertheless, effective asthma therapy in the form of inhaled corticosteroids for
prophylaxis and inhaled bronchodilators with or without oral corticosteroids for acute
episodes, should be widely available as these drugs from part of the World Health
Organisation’s essential drug list. The availability of inhaled therapy for relief and
prophylaxis is regarded as the bare minimum for good asthma management in
developed countries; such therapy has also been reported to be cost effective.$^{20}$

Children with asthma living in developing countries should receive no lesser
treatment. Greater advocacy and education is needed to ensure access to such therapy
for all children in the developing world who need it.

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