

ASTHMA PREVALENCE AND RISK FACTORS IN LATIN AMERICA

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ABSTRACT

Asthma is a common and sometimes fatal chronic disease, and its prevalence has been increasing in all regions of the world, especially among children. The International Study of Asthma and Allergies in Childhood (ISAAC) Phase I has made reliable data available regarding asthma prevalence in Latin America. Current prevalence for wheezing, exercise-induced wheezing, and severe episodes was 17.0%, 19.3%, and 4.6%, respectively, for children aged 13-14 years, and 19.8%, 9.2%, and 4.6%, respectively, for children aged 6-7 years. In Latin America, prevalence showed a trend to be lower in centres located at the northern and southern extremes and higher at centres at tropical latitudes. The significantly higher relative risk for asthma symptoms in centres with hot and humid climate would suggest some relationship between tropical climate and higher prevalence of asthma. The prevalence of asthma symptoms tended to be higher in poorer areas, suggesting that socioeconomic status is a major risk factor for the high prevalence of asthma in Latin America. The Asthma Insights and Reality in Latin America (AIRLA) survey, carried out in 2003, documented an unacceptably high level of patient morbidity from asthma throughout Latin America. The vast majority of patients were not receiving appropriate diagnosis, therapy and monitoring, and were failing to achieve the goals for asthma management set out in the Global Initiative for Asthma (GINA) guidelines. This places a great burden on the health care system and society as a whole, with substantial loss of work and school activity.

Asthma is a common and sometimes fatal chronic disease, and its prevalence has been increasing in all regions of the world, especially among children.^{1,2} In Latin America and in other developing regions of the world, it has been relatively neglected. This is probably because of the much higher impact of acute respiratory infections (ARIs) on children's respiratory health, representing the most important cause of morbidity (and mortality in infancy) in these regions.³ In spite of difficulties in obtaining and comparing data about asthma prevalence, several studies were carried out almost two decades ago, when in the countries of the region prevalence ranged from 4% to 14%.⁴⁻⁸ However, comparisons on variability in symptoms and prevalence were not possible since the definitions and methodology used in the studies were different. A comparative study of the prevalence of respiratory symptoms related to asthma in schoolchildren from Australia, Switzerland, and Chile, determined that prevalence of

asthma in the last 12 months in Chile and Australia was equally high, being 26%, 21%, and 17% for children aged 6, 12, and 16 years, respectively.⁹ Soto-Quiroz *et al.*¹⁰ used a different methodology and came to the conclusion that in Costa Rica (Central America) the prevalence of asthma in children was 23.4%.

The International Study of Asthma and Allergies in Childhood (ISAAC) employs the same validated and standardised methodology for all participating centres throughout the world, providing an excellent opportunity to determine and compare the prevalence of asthma and other allergic conditions in different populations and particularly in developing regions where there was little or no information at all.¹¹ ISAAC Phase I has made reliable data of asthma prevalence in Latin America available.¹² This study includes a descriptive analysis of the prevalence of respiratory symptoms related to asthma obtained by written questionnaires in 52 549 children aged 13-14 years, and in 36 264 children 6-7 years old. Data were provided by 17 centres from 9 Latin American countries, from Mexico in the north, to Argentina and Chile in the south.

There were significant differences in the current prevalence of respiratory symptoms indicative of asthma between countries in the region and also between centres in the same country, with up to fourfold variation in the prevalence of current wheezing in both age groups. There was a trend for asthma prevalence to be lower in centres located at the extremes of latitudes (Cuernavaca, Mexico and Punta Arenas, Chile) with higher rates at tropical latitudes; however, this finding was not always consistent. No significant difference for asthma symptoms was found between boys and girls.

Current prevalence for wheezing, exercise-induced wheezing, and severe episodes was 17.0%, 19.3%, and 4.6%, respectively, for children aged 13-14 years, and 19.8%, 9.2%, and 4.6%, respectively, for children aged 6-7 years. The *mean prevalence for asthma ever* in the groups aged 6-7 and 13-14 years was 13.4% (range 4.1-26.9%) and 12.6% (range 5.5-28.0%), respectively. Lima and Salvador had a higher prevalence, of 26% and 27%, respectively, for *current wheezing* and *nocturnal wheezing* in the group of children aged 13-14 years. Along with Porto Alegre, they also had the highest prevalence of *exercise-induced wheezing*. The prevalences for respiratory symptoms tended to be higher in the group of children aged 6-7 years.

Recently, the publication of ISAAC Phase III¹³ allows comparison with ISAAC Phase I in the same age-group – 6-7 years and 13-14 years – undertaken at least 5 years after the baseline survey.

In the 6-7-years age group, the world prevalence of asthma symptoms changed by 1 SE or more in most centres (59%). Of the 39 centres with changes, prevalence increased in 25 and decreased in 14, and increases occurred more often than decreases for all levels of the mean prevalence. In Latin America in the 8 centres studied that were able to make a comparison, for 5 centres the prevalence did not change, for 2 centres it increased and for 1 it decreased. According to ISAAC

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Phase III¹³ the highest value was noted in Costa Rica (32.1%) and the lowest in Mexico (8.6%).

In the 13-14 year age-group, the world prevalence of asthma symptoms changed by 1 SE or more in most centres (77%). Of the 82 centres with changes, about equal numbers showed an increase (42) and decrease (40) in prevalence. For lower mean prevalence values, more centres showed increases in prevalence of 1 SE or more, but for centres with higher mean prevalence, decreases in prevalence of 1 SE or more were more common. In Latin America the situation is different because within the 16 centres compared, 8 centres showed an increase, 5 showed no change and only 3 centres showed a decreased prevalence. According to ISAAC Phase III¹³ in the adolescent group the highest value was noted for Perú (26%) and the lowest for Mexico (6.6%).

RISK FACTORS

Factors that influence the risk of asthma can be divided into those that cause the development of asthma and those that trigger asthma symptoms; some do both. The former include host factors and the latter are usually environmental factors. However, the mechanisms whereby they influence the development and expression of asthma are complex and interactive.

In Latin America, a trend towards lower prevalence was found at centres located at the northern and southern extremes and a higher prevalence noted at centres at tropical latitudes. The significantly higher relative risk for asthma symptoms at centres with hot and humid climate suggests some relationship between tropical climate and higher prevalence of asthma.¹²

Although indoor and outdoor allergens are well known to cause asthma exacerbations, their specific role in the development of asthma is still not fully elucidated. Among other factors, indoor allergen sensitisation, particularly to house-dust mite (HDM) allergens, is one of the risk factors influencing the development and expression of asthma. A multinational survey on mite sensitisation was carried out in 7 cities from 5 Latin American countries including Argentina (Córdoba and Santa Fe), Brazil (Sao Paulo), Colombia (Bogotá and Cartagena), Mexico (Mexico City) and Venezuela (Caracas).¹⁴ These countries are located in different regions and climates. This study included 297 asthmatic patients, 143 males and 154 females. Patients were skin tested with an allergy battery including extracts of six mite species: *Dermatophagoides pteronyssinus* (*Dp*), *Dermatophagoides farinae* (*Df*), *Aleuroglyphus ovatus* (*Ao*), *Lepidoglyphus destructor* (*Ld*), *Chortoglyphus arcuatus* (*Ca*) and *Blomia tropicalis* (*Bt*). The results demonstrated that skin sensitivity to different mite species was very common, ranging from 30% to *Ld* in Mexico City to 97.2% to *Df* in Caracas, Venezuela. The highest prevalence was found in Sao Paulo (5 out of 6 species) and the lowest in Mexico City (3 out of 6 species). The prevalence of positive skin test to *Dp* in children from Sao Paulo and *Df* in Caracas was higher, 91.2% and 97.2%, respectively. The tropical climate of these two cities with long periods of high temperature and humidity provides adequate growth conditions for mite development.

The information provided by ISAAC Latin America suggests that the marked variability observed in prevalence among centres cannot be explained by methodological, language, geographic, racial, or educational differences. It is likely that the large differences found in prevalence and severity of asthma may be determined mainly by environmental and lifestyle differences rather than genetic differences. Many possible combinations of environmental characteristics and

socioeconomic status may determine the observed variability of prevalence of asthma in this region.

The prevalence of asthma symptoms tended to be higher in poorer areas, suggesting that socioeconomic status is a major risk factor for the high prevalence of asthma in Latin America. Latin American countries have marked differences in economical, cultural and environmental conditions, between them and also within their populations. This could contribute to the observed variability in the prevalence of asthma symptoms. A lower prevalence of asthma had been observed in Hispanics living in USA compared with those who lived in their native countries,¹⁵ supporting the influence of socioeconomic status and its associated environmental risk factors.

The marked differences in the prevalence of asthma between populations who share a similar ethnic background, and now living in Africa or on the Iberian peninsula (Spain and Portugal), and in Latin America,^{11,15} would support the role of environmental factors as determinants for the mentioned differences. The prevalence for wheezing in the last 12 months was lower in Portugal (9.3%, range: 7.4-11.1%) than at Brazilian centres 22.6% (range: 18.4-27.9%); the same occurred with Spain (10.2%, range: 5.5-15.4%) and the other Spanish-speaking Latin American centres (15.0%, range: 6.6-26%). Higher prevalence of asthma was observed in localities with a significant black population compared with the markedly lower prevalences in Africa.

The prevalence of symptoms of asthma was similar, or even lower, at some centres with well-known high levels of air pollution, such as Santiago de Chile, São Paulo, and Buenos Aires when compared to centres with much lower air pollution in the same or different countries. This observation was previously found in Germany¹⁶ and in Chile,¹⁷ and suggests no causal relationship between atmospheric pollution and asthma prevalence in children. Factors predicted to be protective for asthma because they might predispose to a Th1 type of immune response early in life do not seem to play that role in Latin America, where gastrointestinal bacterial infections, parasite infestation, poor hygiene, a high number of children per family, and a high burden and severity of acute viral infection in infancy are common. All the mentioned factors affect children from the first months of life, particularly in the more underprivileged localities. In spite of the prevalence of these supposedly protective factors, the prevalence of respiratory symptoms related to asthma in this region is at least as high as those found by ISAAC at centres from developed countries. Furthermore, it was recently suggested that endemic intestinal helminthic infestations can increase the clinical symptoms of asthma¹⁸ because total IgE and respiratory symptoms of asthma significantly decreased after patients who were infested by *Ascaris lumbricoides* were treated with antihelminthic medications.

ASTHMA MORBIDITY IN LATIN AMERICA

The Asthma Insights and Reality in Latin America (AIRLA)¹⁹ survey was conducted to assess the quality of asthma treatment and control in Latin America by documenting the experience of a wide cross-section of patients with asthma in the community. The AIRLA survey was designed to determine how closely asthma management guidelines are being followed, to assess perception, knowledge and attitudes related to asthma in Latin America, and to assess whether asthma management in countries of the region meets the goals proposed by the Global Initiative for Asthma (GINA) guidelines.¹ The AIRLA survey is part of a worldwide

research programme that has included the Asthma Insights and Reality in Europe (AIRE),²⁰ the Asthma in America,²¹ and the Asthma Insights and Reality in Asia-Pacific (AIRIAP)²² surveys. As the largest and most comprehensive cross-national survey of children and adults with asthma in Latin America to date, the AIRLA study provides a useful estimate of how well the goals of the GINA guidelines are being met in this region.

The AIRLA survey was conducted between May and July 2003 and covered 11 countries: Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Paraguay, Peru, Uruguay, and Venezuela. A total of 46 275 households were screened, and 1 376 adults and 808 children with asthma were identified.

Asthma morbidity is high, with an unacceptably high reliance on the use of emergency or rescue care. Overall, only 2.4% of all patients surveyed met all the GINA criteria for total asthma control. The most likely reasons for this are not only the under-recognition of uncontrolled asthma, underuse of appropriate controller treatment and inadequate patient education and lung function monitoring, but also patient denial and reduced patient expectations of quality of life. The survey suggests that such issues will need to be addressed in Latin America before the aims of achieving and maintaining asthma control, and reducing the burden of this disease, can be realised.

For example, despite the fact that one of the GINA goals is minimal or no symptoms of asthma, more than half (56%) of the persons in our survey reported that they had daytime symptoms at least once a week, and 45% were awakened by symptoms at night at least once a week. Although the GINA goal is no emergency visits to doctors or hospitals, more than half of the people with asthma in this Latin American survey had been hospitalised or had used emergency care because of asthma in the past 12 months. The rate of hospitalisation in the past year (22%) was far higher than in the AIRIAP survey (15%),²² the European (AIRE) survey (7%)²⁰ or the Asthma in America survey (9%).²¹

The GINA goals for asthma management include minimal need for quick-relief β_2 -agonist therapy and inhaled steroids for all patients with persistent asthma. In AIRLA, 54% of the people with asthma had used prescription quick-relief medicines for their asthma in the previous 4 weeks. Most who used inhalers for quick relief reported that they had used them daily in the previous 4 weeks. On the other hand, only 6% of the patients reported being treated with anti-inflammatory drugs and inhaled steroids to reduce or prevent airway inflammation.

Activity limitation caused by asthma was considerable: most adults (79%) and children (68%) reported that their asthma symptoms limited their daily activities in some way. Specifically, asthma sufferers reported activity limitation in sports and recreation (50%), normal physical activities (41%), lifestyle (37%), social activities (29%), choice of jobs or careers (30%, adults only), sleeping (46%) and household chores (37%). In addition, 31% of the adults and 58% of the children with asthma in this study reported that their asthma had caused them to miss work or school days in the last year.

In summary, the AIRLA survey documents an unacceptably high level of patient morbidity from asthma throughout Latin America. The vast majority of patients were not receiving appropriate diagnosis, therapy and monitoring, and were failing to achieve the goals for asthma management set out in the GINA guidelines. This places a great burden on the health care system and society as a whole,²³ with substantial loss of work and school activities.

Declaration of conflict of interest

The author has received educational support from GlaxoSmithKline, Altana and Novartis, has been a speaker for GlaxoSmithKline, Novartis and Schering-Plough and is a member of the advisory board for GSK (Latin American Asthma Advisory Board).

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