ORIGINAL ARTICLE

The Burden of Unscheduled Health Care for Asthma in Latin America

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Abstract

Objectives: To determine the level and cost of unscheduled health care resource use in adults and children across all asthma symptom severities in Latin America.
Methods: The level and cost of health care resource use were analysed for 2074 patients with asthma included in the Asthma Insights and Reality in Latin America (AIRLA) survey from 10 Latin American countries. Health care resource use was multiplied by country-specific unit costs to estimate average per-patient annual costs. Patients were classified as adults (≥16 years) or children (<16 years), with disease severity categorized using a symptom severity index.
Results: Persistent asthma symptoms were experienced by 53.1% of patients (50.1% of children and 54.6% of adults). In the year preceding the survey, 57.1% of patients required unscheduled health care resource use and 45.1% reported at least 1 emergency hospital contact. The percentage of patients reporting unscheduled health care resource use was greatest amongst those with severe persistent symptoms (71.9%) but it was also high in those with mild intermittent symptoms (45.7%). An average of 73.2% of annual costs of asthma-related health care for the 10 countries was due to unscheduled health care. Expenditure on unscheduled care was greatest amongst both adults and children with severe persistent asthma symptoms (US $558 and US $769, respectively). Adults and children with mild intermittent symptoms also incurred considerable unscheduled costs (US $204 and US $215, respectively).
Conclusions: Poorly controlled asthma imposes a considerable cost burden driven by unscheduled health care resource use in Latin America. Treatments to control asthma and reduce the need for unscheduled health care could reduce this cost in both adults and children.

Key words: Asthma prevention and control. Latin America. Cost.

Resumen

Objetivos: Determinar el nivel y el coste del uso no programado de recursos sanitarios por parte de adultos y niños con todos los grados de intensidad de los síntomas del asma en Latinoamérica.
Métodos: Se analizaron el nivel y el coste del uso de recursos sanitarios en 2.074 pacientes con asma incluidos en el estudio *Asthma Insights and Reality in Latin America* (AIRLA) de diez países latinoamericanos. El uso de recursos sanitarios se multiplicó por los costes unitarios específicos de cada país para calcular los costes anuales medios por paciente. Los pacientes se clasificaron como adultos (≥ 16 años) o niños (<16 años), y la gravedad de la enfermedad se categorizó mediante un índice de intensidad de los síntomas.
Resultados: El 53,1% de los pacientes experimentaron síntomas persistentes de asma (50,1% en niños y 54,6% en adultos). En el año anterior al estudio, el 57,1% de los pacientes requirieron el uso no programado de recursos sanitarios y el 45,1% notificaron haber acudido como mínimo una vez de urgencias al hospital. El porcentaje de pacientes que notificaron un uso no programado de recursos sanitarios fue mayor en los pacientes con síntomas persistentes intensos (71,9%), aunque también fue elevado en los pacientes con síntomas intermitentes leves (45,7%). Un promedio del 73,2% de los costes sanitarios anuales relacionados con el asma en los diez países se debió a asistencia sanitaria no programada. El gasto en asistencia no programada fue mayor en adultos y niños con síntomas persistentes e intensos de asma (558 y 769 dólares estadounidenses, respectivamente). Los adultos y niños con síntomas intermitentes leves también incurrieron en considerables costes no programados (204 y 215 dólares estadounidenses, respectivamente).
Conclusiones: El asma mal controlada supone una carga económica considerable debido al uso no programado de recursos sanitarios en Latinoamérica. Los tratamientos para controlar el asma y reducir la necesidad de asistencia sanitaria no programada podrían reducir estos costes tanto en adultos como en niños.

Palabras clave: prevención y control del asma; Latinoamérica; coste.

Introduction

Asthma is a common chronic disease that is increasing in prevalence in many regions of the world [1,2]. Prevalence is high in Latin America, where it affects people of all ages [3,4]. The International Study of Asthma and Allergies in Childhood (ISAAC) showed that the prevalence of asthma among children in Latin America ranges from 4% to 28% and that its prevalence continues to grow above the global average according to results from ISAAC Phase I and Phase III studies [5]. In Latin American countries, as in other countries, asthma places a considerable burden on both individuals and society [2, 6-8].

Despite global consensus on the goals of asthma management, many patients around the world have poorly controlled asthma, as has been shown in the Asthma Insights and Reality (AIR) surveys conducted in Europe, the United States, and Asia Pacific [9-11]. In Latin America, the Asthma Insights and Reality in Latin America (AIRLA) survey was conducted to assess the quality of asthma treatment and control in 11 countries (Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Paraguay, Peru, Uruguay, and Venezuela) in addition to asthma-related health care resource use in 2005 [12].

International studies have indicated that uncontrolled asthma is a key determinant of the high cost of asthma, primarily due to unscheduled health care resource use, such as visits to emergency rooms and hospitalization [13,14]. Unscheduled health care resource use increases with asthma severity [15], and may reflect suboptimal medication therapy [16]. Cost analyses in a range of countries have demonstrated that poorly controlled asthma increases the use of unscheduled health care resources [17-19]. With the limited resources for health care available in Latin America, improving asthma control is seen as a way of reducing costs while optimizing outcomes [5].

The objectives of these analyses of the AIRLA data were to evaluate unscheduled health care resource use stratified by patient-reported asthma severity and to apply costs to resource use in order to give an overall evaluation of cost burden. Quantification of avoidable health care burden helps identify the level of suboptimal asthma control and areas for future improvement.

Methods

The patients included in this analysis had asthma and had participated in the AIRLA survey, whose methods have been described in detail previously [15]. In brief, this survey took place in the 10 Latin American countries described between May and July 2003. The survey design required a sample of approximately 400 asthma patients in each of the 3 largest countries (Argentina, Brazil, and Mexico) and samples of approximately 100 patients in the remaining 8 countries.

Participants were interviewed by telephone (in Argentina, Brazil, and Chile) or face to face (in Colombia, Costa Rica, Ecuador, Mexico, Peru, Uruguay, and Venezuela) using a structured survey format. The survey included questions on symptom severity, perceived asthma control, and asthma-related health care resource use. Parents responded on behalf of asthmatic children aged under 16 years.

Patient responses relating to the use of unscheduled and scheduled health care resources (physician contact, emergency room care, hospitalizations) were extracted from the AIRLA dataset. The numbers and percentages of patients reporting each category of health care resource use were stratified by symptom severity level for adults (≥16 years old) and children (<16 years). Where values were reported for adults and children combined, the values were weighted to reflect the proportion of adults and children in the final sample.

For each country, unit cost estimates were obtained for each resource event (hospital stay, emergency room contact, and physician contact). Separate unit costs were obtained for patients treated in the private and public sectors. The unit costs were weighted by the proportion of patients with access to private health care in each country to calculate the average unit cost of each resource event for each country. For example, in Mexico the cost of an overnight stay in hospital was reported to be Mex $3150 in the public sector and Mex $4570 in the private sector; 12% of the population were reported to have access to private health care. The average unit cost was calculated as 12% (patients with access to private health care) × Mex $4570 (private price) + 88% (patients with no access to private health care) × Mex $3150 (private price) = Mex $3320 (average unit cost).

The cost for hospital care took into account the number of nights in hospital. Local currency costs were converted at the time of analysis to US dollars. Patient responses were insufficiently detailed to allow a reasonable estimate of medication use, so medication costs were not included in the analysis. There was also insufficient information available on unit costs in Paraguay to include patients from this country in the economic analysis.

Mean per-patient annual costs were calculated for 3 resource use categories: scheduled care, unscheduled care, and scheduled and unscheduled care combined. Mean costs were calculated for each level of the symptom severity score, and additionally the proportion of the total per-patient cost made by unscheduled care was derived. Costs were calculated for adults and children separately as well as for all patients.

Results

Population

In the original AIRLA survey, from a screening population of 46 275 households from the 11 countries, 2184 interviews were completed by 1376 adults and by proxy for 808 children. The interviews averaged 30 minutes in length (range, 24-51 minutes). In these secondary analyses, 2074 original patient interviews were utilized: 1372 adult interviews (66.3%) and 697 proxy interviews (for children <16 years old). Around one third of the sample were male (mean proportion 38%, ranging from 30% in Chile to 48% in Ecuador). The mean age of the sample was 31.3 years (ranging from 22.6 years in Venezuela to 39.2 years in Uruguay).

Table 1. Unscheduled Health Care Resource Use in Year Prior to Study

	Patients With				
	Mild Intermittent Asthma (n=972)	Mild Persistent Asthma (n=443)	Moderate Persistent Asthma (n=211)	Severe Persistent Asthma (n=448)	Total Patients (n=2074)
Overnight inpatient stay, No. (%) of patients	137 (14.1)	114 (25.7)	47 (22.3)	143 (31.9)	441 (21.3)
Mean nights/patient, No.	0.7	1.5	0.9	2.4	1.2
Emergency room visits, No. (%) of patients	307 (31.6)	227 (51.2)	86 (40.8)	245 (54.7)	865 (41.7)
Mean visits/patient, No.	0.7	1.9	1.3	3.0	1.5
Primary care visits, No. (%) of patients	383 (39.4)	266 (60.0)	107 (50.7)	287 (64.1)	1043 (50.3)
Mean visits/patient, No.	1.0	2.4	1.9	3.2	1.9
Unscheduled use,[a] % of patients	45.7	67.0	57.8	71.9	57.1
Hospital contact,[b] % of patients	34.3	55.3	44.5	58.7	45.1

[a]Unscheduled overnight inpatient stay, emergency room visit or emergency primary care visit.
[b]Unscheduled overnight inpatient stay or emergency room visit.

Fifty-three percent of patients (n=1102) had persistent asthma symptoms; the percentages for adults and children were 54.1% and 50.1%, respectively. However, patient-reported asthma symptom severity differed by country and Argentina and Chile reported proportionally more patients with severe persistent asthma than other countries.

Asthma-related Health Care Use

The majority of patients (84.7%) reported at least 1 scheduled visit to the treating physician during the previous year, with a high proportion regardless of age or asthma symptom severity. The mean number of visits per patient was 10.98, ranging from 6.75 for patients with mild intermittent asthma symptoms to 18.61 for patients with severe persistent symptoms.

The proportion of patients reporting use of unscheduled health care resources (unscheduled visit to a physician, emergency room visit, hospitalization) in the previous year at different levels of asthma symptom severity are shown in Table 1. In the previous year, 57.1% of patients required unscheduled health care and 45.1% reported at least 1 hospital contact. Of the patients with severe persistent asthma symptoms, 31.9% required unscheduled in-patient hospital management, compared to 14.1% of patients with mild intermittent symptoms. Although the proportion of patients requiring unscheduled health care use was highest in those with severe persistent symptoms, those with mild asthma symptoms also required substantial unscheduled health care resource use. Nearly half (45.7%) of the patients with mild intermittent asthma and two-thirds (67.0%) of those with mild persistent asthma required some unscheduled health care resource use during the previous year. Furthermore, a third (34.3%) of patients with mild intermittent symptoms reported a hospital contact in the previous year.

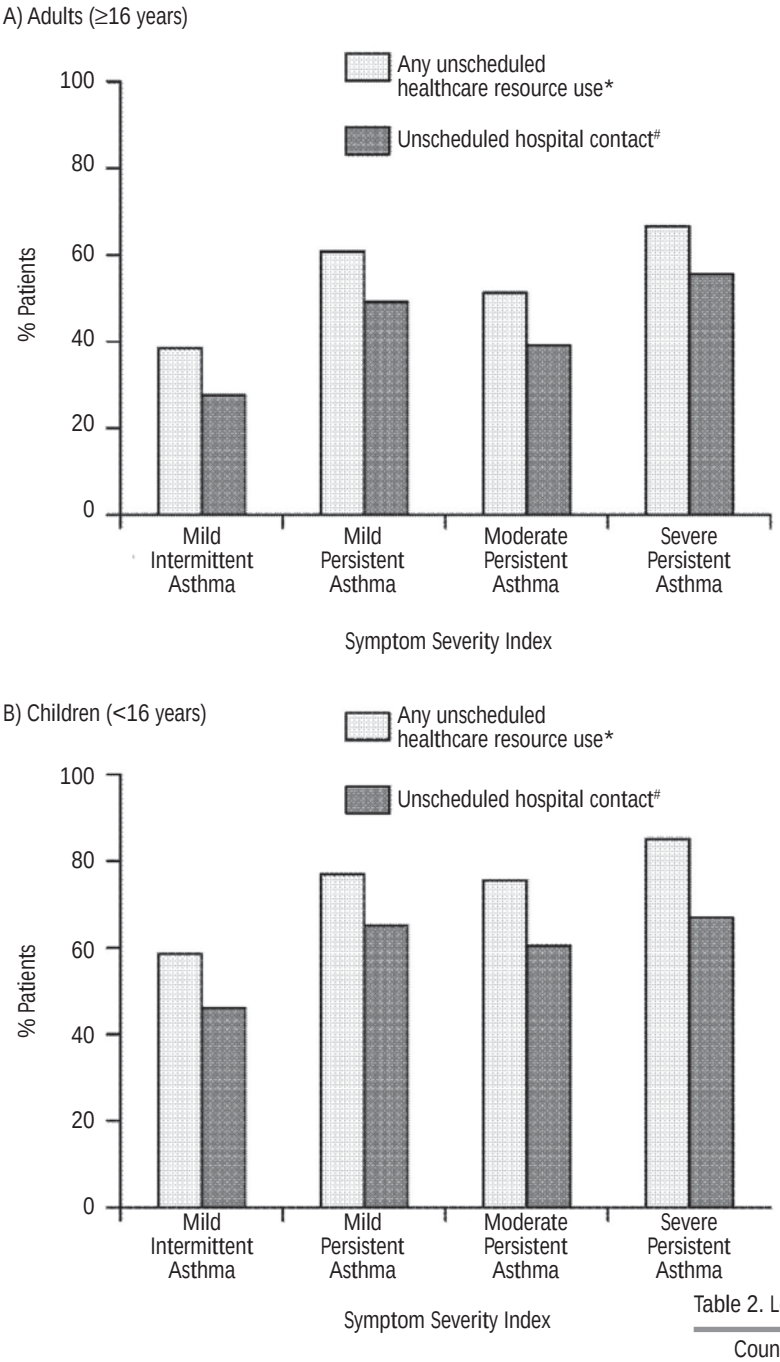
Unscheduled health care resource use was particularly high among children (Figure 1). More than half of the children with mild intermittent symptoms (59%) required unscheduled health care resource use, and 46% required unscheduled hospital contact. The corresponding percentages for those with severe persistent asthma symptoms were 85% and nearly 67%, respectively. The mean number of unscheduled visits per child compared to that for adults was as follows: overnight stay, 1.4 vs 1.2; emergency room visits, 1.9 vs 1.4; and physician visits, 2.6 vs 1.5.

Cost of Asthma-related Health Care Use

Weighted average local country health care costs were applied to each country's resource use data (Table 2). In-patient hospital care costs were disproportionately higher in Costa Rica than elsewhere and costs varied considerably according to country.

The proportion of health care costs corresponding to unscheduled care varied widely, from 45.6% in Ecuador to 90.4% in Venezuela, with a mean for the 10 countries of 73.2%. The proportion of health care costs corresponding to unscheduled care was over 50% in all cases except Ecuador (45.6%) and Chile (49.0%).

Expenditure on asthma-related health care at different levels of symptom severity is shown in Figure 2. The cost of unscheduled asthma care in adults was US $558 for those with severe persistent asthma symptoms and US $204 for those with mild intermittent symptoms. Likewise, for children with severe persistent asthma symptoms, the cost of unscheduled asthma care was US $769 and for those with mild intermittent symptoms US $215. Among both adults and children, scheduled health care costs were approximately 3-fold higher



*Unscheduled overnight inpatient stay, emergency room visit or emergency primary care visit.
#Unscheduled overnight inpatient stay or emergency room visit.

Figure 1. Unscheduled health care resource use by age group.

in those with severe persistent symptoms than in those with mild intermittent symptoms.

Regardless of symptom severity, almost three-quarters of expenditure was due to unscheduled health care (Figure 2). The proportion of expenditure on unscheduled health care showed little association with the age of the patient (average 73.2% in adults and 74.6% in children).

Discussion

This secondary analysis of the AIRLA dataset demonstrates the cost consequences of the low level of control previously demonstrated [15]. Seventy-three per cent of expenditure on health care for patients with asthma in the region was spent on unscheduled care. Severe persistent asthma symptoms, often indicative of treatment regimens within countries, contributed to use of health care, particularly unscheduled visits, and the proportions reporting severe asthma varied by country, with Chile reporting the highest proportion. Children used more unscheduled health care than adults, with 59% of individuals with mild symptoms and 85% of those with severe symptoms requiring unscheduled care. Unscheduled care expenditure was therefore higher for children (range, US $769-US $215) than for adults (range, US $558-US $204).

A possible limitation of this study is the proxy reporting of asthma symptom severity by parents, as it has previously been shown that parents underestimate rather than overestimate symptom severity [20]. It is therefore likely that some pediatric patients may have had more severe symptoms than reported by their parents. Thus, the burden distribution across the symptom severity index may be slightly skewed. Nevertheless, this is likely to be conservative and would not alter the considerable cost burden for uncontrolled asthma in these South American populations.

Table 2. Local Health Care in 10 Countries Applied to Resource Use

Country	Unit Cost[a]		
	Night in Hospital	ER Visit	Physician Visit
Argentina	87.54	2.04	7.00
Brazil	74.52	13.72	6.52
Chile	285.72	64.68	23.58
Colombia	86.02	93.39	7.31
Costa Rica	423.00	99.00	40.00
Ecuador	98.72	30.76	12.84
Mexico	299.14	140.49	9.95
Peru	56.76	32.91	10.34
Uruguay	110.18	24.79	4.52
Venezuela	372.94	246.02	6.12

Abbreviation: ER, emergency room.
[a]Weighted average of private and public sector costs in US dollars.

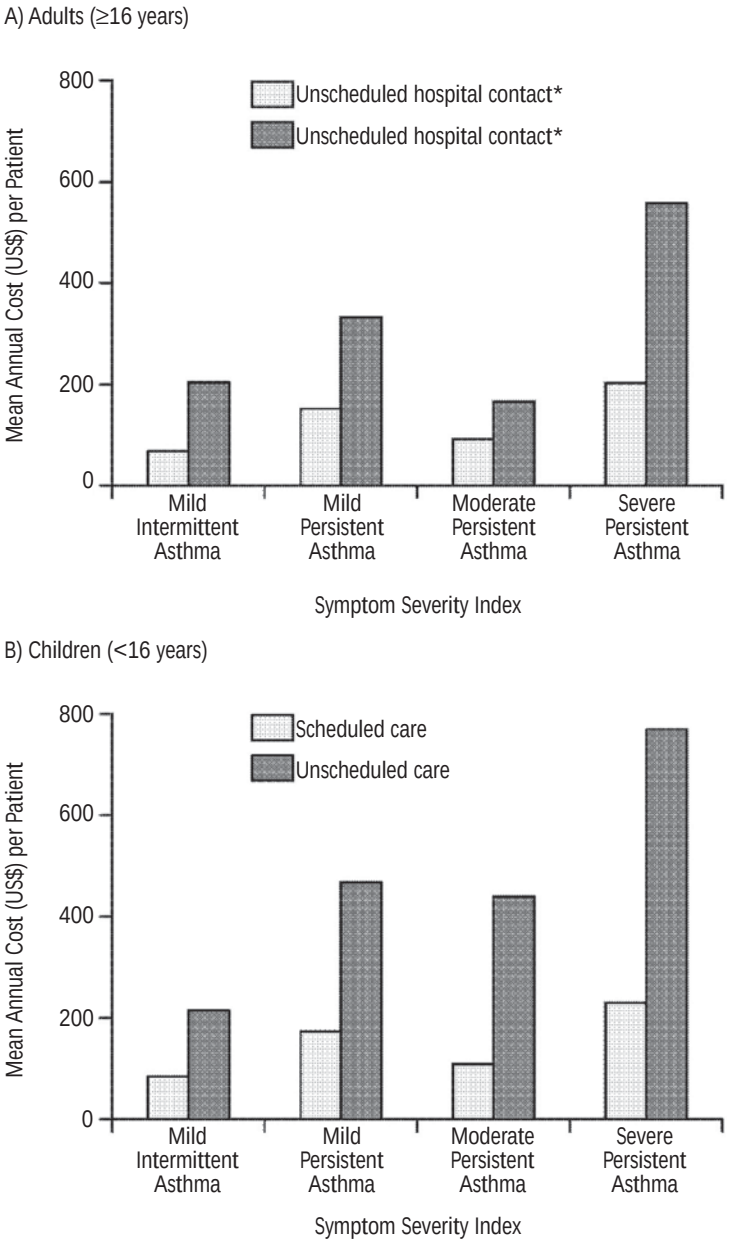


Figure 2. Cost of asthma-related health care.

It was not possible to include the cost of medications in the analysis presented here. The data collected in the original AIRLA survey were insufficiently detailed to allow reliable estimation of the cost of medication. Consequently, this analysis includes only the costs associated with consultations with the treating physician, emergency room visits, and hospitalization. Although the inclusion of medication costs would have given a more complete picture, the omission is unlikely to affect the overall conclusion that poorly controlled asthma is associated with increased health care costs, as similar findings are reported in studies that included medication costs [18,21].

Among both adults and children, total health care resource use increased with increasing frequency and severity of asthma symptoms. There was an approximately 3-fold increase in both scheduled and unscheduled health care resource use as symptom severity increased from mild intermittent symptoms to severe persistent symptoms among adults and children. Despite this increase with symptom severity, it is important to note the high level of health care resource use in patients with mild symptoms—some 38.4% of adults and 58.6% of children with mild intermittent symptoms—required unscheduled health care resource use in the preceding year. Given the large proportion of patients in the region with mild symptoms (estimated in this survey as 65.3% of adults and 74.2% of children), unscheduled health care resource among these patients contributed to a substantial share of the total economic burden of asthma health care resource use.

This analysis considered direct health care costs only and did not include an appraisal of indirect costs arising from time lost from work or school. Most adults (79%) and children (68%) included in the survey reported that their asthma symptoms limited their daily activities in some way [12]. Almost a third of AIRLA adults (31%) and more than a half of the children (58%) reported that asthma had resulted in time lost from work or school in the last year. Including the cost of lost productivity arising from this time would have substantially increased the estimated cost burden associated with poor asthma control.

The aim of treatment is always avoidance of the need for emergency health care [1,22,23]. Unscheduled health care resource use is largely avoidable with accurate and timely diagnosis, and appropriate management [14]. However, in the Latin American region access to medication and routine care for asthma is lacking [24], particularly for those in rural areas and in certain countries such as Brazil. The lack of access to care tends to increase the need for emergency treatment and consequently health care costs [25]. Another key difference regarding asthma management in Latin American and Europe is the low prescription of controller medication (inhaled corticosteroids) in Latin America [26-28]. This results in suboptimal treatment, particularly for patients with moderate and severe asthma, higher exacerbation rates, and the subsequent need for emergency care and sometimes hospitalization.

The fact that the study was based on patient recall over a period of a year could potentially introduce inaccuracies [29]. However, many of the questions referred to experiences in the past week, which is recent and frequent enough to be recalled with acceptable accuracy, without concern for bias. A severe episode of symptoms is considered to be similar to emergency visits, and recall of emergency events, in particular, has been found to have acceptable accuracy over an extended period [30].

In conclusion, this economic analysis of the AIRLA survey demonstrates the burden imposed on Latin American countries by poorly controlled asthma. Seventy-three per cent of the costs attributed to asthma

care are from unscheduled, emergency care. Whilst many countries in Latin America do not currently have access to routine care for asthma, improvements in access to medications and appropriate prescribing may help reduce the considerable costs associated with poorly controlled asthma.

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