

Asthma Mortality in Latin America

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SUMMARY

There are not enough data concerning asthma mortality in Latin America. The Latin American Society of Allergy and Immunology coordinated this project to provide reliable data for gaining knowledge about our present situation, which is a condition indispensable to changing it. The following countries participated in this study: Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Mexico, Paraguay, Peru, Uruguay and Venezuela. A uniform protocol was designed in Santa Fe, Argentina. Asthma mortality rates were analyzed in accordance with two variables: age-adjusted rates (5-34) and total death rates. The total population studied was 107,122,529 inhabitants. The highest death rates were found in Uruguay and Mexico (5.63), and the lowest in Paraguay (0.8) and Colombia (1.35). Age-adjusted (5-34) rates were higher in Costa Rica (1.38) and lower in Chile (0.28). Regarding sex, the analysis of the information provided by seven countries showed a predominance of females (51.8%) over males (48.18%). In the southern Latin American countries such as Chile, Uruguay, Paraguay and Argentina, which have marked climatic differences, deaths occurred mainly in the winter. It is important to emphasize that, in most countries, deaths from asthma occurred at home: Chile (60.7%), Argentina (63.4%) and Paraguay (88%). However, in Uruguay, 58.6% occurred during hospitalization. Mortality rates from bronchial asthma are high in most of the Latin American countries studied, even though further studies are needed. Asthma is a serious global health problem. People of all ages in countries throughout the world are affected by this chronic airway disorder that can be severe and sometimes fatal. The health ministries of each country do not believe asthma is a significant issue. Therefore, we should provide them with sound epidemiological studies to convince them to change their attitude toward this disease.

Key words: Asthma mortality - Epidemiology of asthma - Death certificates and asthma

INTRODUCTION

Bronchial asthma can be fatal at any age. This contradicts the concepts held by Laennec, who reported that this disease may not constitute a cause of death, and by Osler, who denied that an asthmatic attack may end in death. Trousseau, emphasizing their beliefs even more, asserted that asthma conferred longevity. These affirmations led physicians to hold that asthma could not threaten life. Thus, although asthma-related deaths were first reported in 1920, they were not universally acknowledged until 1950.

Mortality rates will help us to reconsider the importance of asthma, analyze its causes and implement therapeutic measures to reduce them. During the last decade there was a progressive increase in asthma-related mortality rates in the United States (1-3), as well as in Canada, France, Great Britain, Australia and New Zealand (4, 5). Such an increase in mortality rates correlated with increased hospitalizations due to bronchial asthma, which lead to higher morbidity and mortality of the disease (6, 7).

There is not enough data concerning asthma mortality in Latin America. The Latin American Society of Allergy and Immunology coordinated this study to provide reliable data for gaining knowledge about our present situation, which is indispensable to changing it.

MATERIALS AND METHODS

The following countries participated in this study: Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Mexico, Paraguay, Peru, Uruguay and Venezuela. A uniform protocol was designed in Santa Fe, Argentina, and supervised by the "Emilio Coni" National Epidemiologic Institute. Populational data were provided by the national statistics and census institutes of each country.

Table 1
Asthma mortality in Latin America in a studied population of 107,122,529.

Country	Rate		Town/country	Num. surveyed	Period
	Rate x	Age-adjusted 5/34 x			
Argentina	3.38	0.68	Country	32,470,000	1980/1989
Brazil	2.04	0.48	São Paulo City	9,466,701	1980/1991
Chile	1.80	0.28	Country	13,473,347	1980/1990
Colombia	1.35	0.33	Atlantic-Bolivar Province	2,902,876	1986/1990
Costa Rica	3.76	1.38	Country	3,087,685	1982/1991
Cuba	4.09	1.8*	Country	10,700,000	1983/1992
Mexico	5.63	NA	Monterrey State	3,080,466	1980/1990
Paraguay	0.8	NA	Country	3,121,640	1991
Peru	3.7	NA	Lima City	5,992,600	1986/1991
Uruguay	5.63	0.59	Country	3,094,214	1984/1990
Venezuela	3.1	0.82	Country	19,773,000	1980/1989
Average	3.14	0.65	Country	107,122,529	

*5-44 years of age.

Mortality rates were estimated according to the following requirements:

- Total population was divided into age groups by years of age in accordance with the World Health Organization (WHO) norms for vital statistics: 0-4; 5-9; 10-14; 15-19; 20-24; 25-29; 30-34; 35-39; 40-44; 45-49; 50-54; 55-59; 60-64; 65-69; 70-74, 75 or older. To obtain representative results, populations should exceed 3 million.
- Total deaths from asthma, according to sex and age, and based on death certificates were collected.
- Mortality rates were calculated using the formulas below. Population was calculated in the middle of the year studied.

$$\text{Mortality rate} = \frac{\text{Deaths from asthma in one country during one year} \times 10^6}{\text{Total population}}$$

$$\text{Age-adjusted mortality rate} = \frac{\text{Deaths from asthma in one country in the age group specified} \times 10^6}{\text{Population of the age group in one country}}$$

- Rates were calculated based on death registers coded according to the ninth revision of the International Classification of Diseases and Causes of Death (ICD-9) that went into effect January 1, 1979. This ninth revision is of great importance since it classifies asthma separately from other chronic obstructive pulmonary diseases.

The WHO identified different diseases according to their etiology or pathophysiological mechanisms through the ICD-9, which led to the more accurate codification of the cause of death that may be implemented in statistical studies. Codes from 466 to 529 (25 codes) are assigned to nontraumatic diseases of the respiratory system. Bronchial asthma is coded 493 and subcoded 493-0 (extrinsic asthma), 493-1 (intrinsic asthma) and 493-9 (nonspecified asthma).

This classification is useful when the patient is alive, but not when the cause of death is to be coded since

most deaths from asthma occur at home without medical assistance, and furthermore, the professional who completes the death certificate is not the specialist who has been treating the disease and does not know its etiological causes.

Death certificates also provided information about date and place of death.

RESULTS

Table 1 shows mean mortality and age-adjusted (5-34) rates in the different countries. The total population studied was 107,122,529 inhabitants.

The highest death rates were found in Uruguay and Mexico (5.63), and the lowest in Paraguay (0.8) and Colombia (1.35). Age-adjusted (5-34) rates were higher in Costa Rica (1.38) and lower in Chile (0.28). Data provided by Cuba included an age group from 5 to 44 (1.8).

Regarding sex, analysis of the information provided by seven countries showed a predominance of females (51.8%) over males (48.18%). Male deaths prevailed in the mid-1980s in Peru and Chile, but afterwards, a progressive increase in female deaths was observed (Table 2).

In southern Latin American countries such as Chile, Uruguay, Paraguay and Argentina, which have marked

Table 2
Sex-related asthma mortality.

Country	Male (%)	Female (%)
Argentina	51.8	48.2
Brazil	49.7	50.3
Chile	45.0	55.0
Colombia	47.7	52.3
Costa Rica	46.6	53.5
Paraguay	44.0	56.0
Peru	52.7	47.3
Uruguay	48.0	52.0
Average	48.2	51.8

Table 3
Asthma mortality by period of time.

Month	Country	
	Argentina Province of Santa Fe (1980-1989)	Colombia Atlantic and Bolivar Provinces (1986-1990)
January	54	12
February	62	17
March	67	5
April	72	17
May	118	17
June	136*	17
July	147*	20
August	108	19
September	102	18
October	91	20
November	77	18
December	61	11
Total	1095	191

*June/July: 25.9%.

climatic differences, deaths occurred mainly in the winter. In Santa Fe Province, Argentina (9), 26% of the total deaths occurred in June and July, and were more frequent on Fridays (15.2%) and Saturdays (15.2%) (Table 3 and Figs. 1 and 2).

It is important to emphasize that in most countries, deaths from asthma occurred at home: Chile (60.7%), Argentina (63.4%), and Paraguay (88%). However, in Uruguay, 58.6% occurred during hospitalization. In Colombia, a less marked predominance of inpatient deaths was observed. Nevertheless, it is logical to state that the 18.8% nonidentified places of death did not occur at hospitals (Table 4).

In Argentina, the average rate of deaths from asthma during the 1980s, based on data provided by the "Emilio Coni" National Epidemiologic Institute, was 3.38, showing lower values in 1982 (3.03) and higher values in 1987 (3.6).

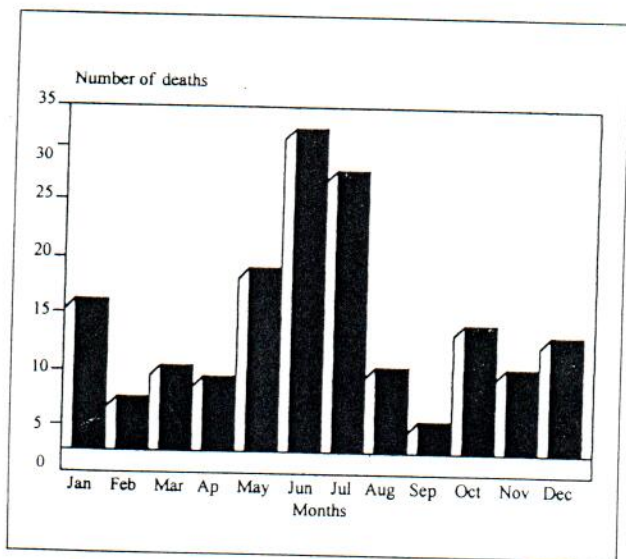


Fig. 1. Asthma mortality by month in Uruguay in 1990.

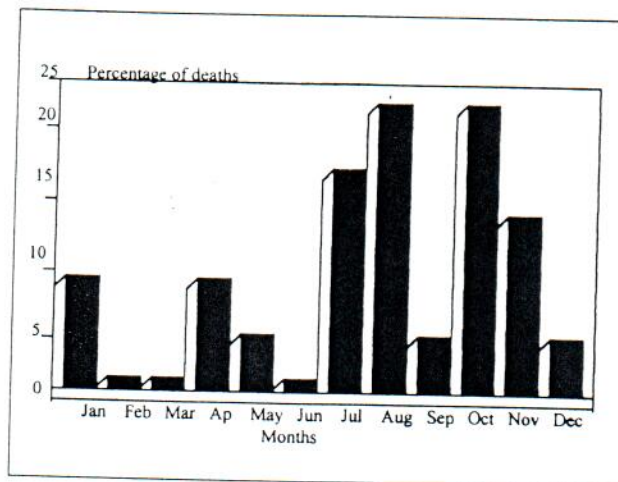


Fig. 2. Asthma mortality by month in Paraguay in 1991.

Table 4
Asthma mortality and place of death.

Country	Place of death		
	Hospitalized	Home	Not identified
Argentina	37.6	63.4	
Chile	39.3	60.7	
Colombia	39.7	36.6	18.8
Paraguay	12.0	48.0	40.0
Uruguay	58.6	40.0	

Death rates in industrialized areas with great economic development and in huge urban conglomerates (3.82 ± 64) prevailed over those for less developed regions (2.09 ± 0.19) (12).

In Santa Fe Province (1979/1988), the average rate was 4.17 and the age-adjusted (5-34) rate was 0.685. In Córdoba Province (1980/1991), it reached 5.02 (10). It is worth noting that during the present decade, deaths from asthma were highest in 1985: 176 (rate: 6.81) in Córdoba and 135 (rate: 5.0) in Santa Fe.

In Santa Fe, 23,333 people died from different causes in 1987, 1476 from nontraumatic diseases of the respiratory system (codes 466 to 529) and 129 from bronchial asthma. Asthma represented 0.55% of total deaths and 8.73% of deaths occurred due to nontraumatic diseases of the respiratory systems, which placed it in fifth place in this last subgroup. It was also more common in females (Table 5).

In Uruguay, 7% of the total deaths in 1990 were due to nontraumatic diseases of the respiratory system, with 7.79% due to bronchial asthma.

DISCUSSION

Knowing the Latin American situation regarding bronchial asthma, its socioeconomic impact and the quality of life of asthmatic patients is a real challenge for those involved with asthma management. Our vast continent

Table 5

Mortality in Santa Fe Province (inhabitants: 2,725,000; asthma mortality rate: 4.7 per 100,000 inhabitants) in 1987.

	Mortality		
	Overall	Codes 466 to 529*	Code 493 (asthma)
Males	13,104	889	62
(5-34 years of age)			(10)
Females	10,223	587	67
(5-34 years of age)			(3)
Total	23,336	1476	129
(5-34 years of age)			(13)
Rate per 100,000			4.7
(5-34 years of age)			(1.01)

*Nontraumatic diseases of the respiratory system.

with its geographical and climatic differences and economic and racial inequality forms a very heterogeneous population that poses numerous obstacles when making a global assessment. The aim of evaluating asthma-related mortality in Latin America based on death certificates presented many difficulties:

- a) In some countries, before the implementation of the ICD-9, bronchial asthma was not individually identified as a cause of death. It was included within the codes of other respiratory pathologies, such as chronic bronchitis, bronchiectasis, emphysema, non-specified bronchitis and extrinsic allergic alveolitis (490-496).
- b) Death certificates were occasionally completed by the professional who had been treating the disease and generally the person who signed it was not present at the time of the death.

Death rates showed great variations due to environmental, racial, socioeconomic and medical causes, and also due to the methodology applied to filling out death certificates in the different Latin American countries.

Medical variables are related to undergraduate and postgraduate education. Physicians should be able to identify asthma properly, both when the patient is alive and when completing a death certificate.

The average of deaths in the Southern Cone countries (Argentina, Uruguay, Paraguay and Chile) ($x = 2.56$) is lower than that in the region called "Bolivariana" (Colombia, Peru and Venezuela), Central America (Cuba and Costa Rica) and Mexico ($x = 3.60$). The average of deaths considering all the countries studied ($x = 3.14$) is similar to the values found in Great Britain and Wales, lower than in Australia, New Zealand, West Germany and Japan, and higher than in the United States of America and Canada (13).

The age-adjusted (5-34) average is 0.65; it is the most reliable because there is more accuracy (85%) in identification and codification of the cause of death (14, 15).

In contrast with reports of an increase in deaths from asthma related with the female sex in this Latin American study, in accordance with the reports of Sly *et al.* (16), there are no statistically significant differences between sexes (females: 51.8%; males: 48.18%).

Countries with marked climatic differences show a rate increase in the winter when the prevalence of viral and bacterial infections of the airways is high. Such infections can trigger off asthma exacerbations in patients with bronchial hyperreactivity (17, 18).

Deaths occurred most frequently at home. The most common and important factor associated with this has been an inability of the patient to appreciate the severity of the asthmatic attack, leading to an inevitable delay in seeking appropriate medical treatment and assistance.

CONCLUSIONS

Data from the different countries lead to the conclusions that:

- 1) Mortality rates from bronchial asthma are high in most of the Latin American countries studied, even though further studies are needed.
- 2) Postgraduate education for health-care professionals should stress the importance of:
 - a) Accuracy of death certificate procedures.
 - b) Avoidance of subdiagnosis in bronchial asthma.
- 3) This first joint study that allowed us to discover global aspects of asthma mortality in Latin America should be continued to identify the origin of the differences.
- 4) Asthma is a serious global health problem. People of all ages in countries throughout the world are affected by this chronic airway disorder that can be severe and sometimes fatal. Health ministries of each country do not believe asthma is a significant issue. Therefore, we should provide them with sound epidemiological studies to convince them to change their attitude toward this disease.

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RESUMEN

En Latinoamérica, los datos sobre mortalidad por asma son escasos y es por ello que la Sociedad Latinoamericana de Alergia e Inmunología coordinó el presente trabajo a efectos de conocer nuestra realidad, condición imprescindible para posteriormente intentar modificarla. Participaron en el estudio los siguientes países: Argentina, Brasil, Chile, Colombia, Costa Rica, Cuba, Méjico, Paraguay, Perú, Uruguay y Venezuela,

incluyendo una población de 107.122.529 habitantes. Se utilizó un protocolo uniforme elaborado en la ciudad de Santa Fe, Argentina, bajo la supervisión del Instituto Nacional de Epidemiología Emilio Coni. Las tasas de mortalidad bruta más elevadas se evidenciaron en Uruguay y Méjico (5,63) y las más bajas en Paraguay (0,8) y Colombia (1,35). En cuanto a la tasa específica en el grupo etáreo comprendido entre los 5 y 34 años, el valor mayor se apreció en Costa Rica (1,38) y el menor en Chile (0,28). Los datos de Cuba (1,8) incluyen 10 años más (5 a 44 años). En cuanto al sexo, el análisis de los siete países que remitieron los datos evidencian un ligero predominio del sexo femenino (51,8%) respecto del masculino (48,18%). En relación a la época del año, en los países australes de Latinoamérica, Chile, Uruguay, Argentina, con marcadas diferencias climáticas, se observa un claro predominio de exitus durante el invierno. En el caso específico de la provincia de Santa Fe (Argentina), en los meses de junio y julio ocurrieron el 27% del total de defunciones, que fueron más frecuentes los viernes (15,2%) y sábados (15,2%). Cabe destacar que en la mayoría de los países los fallecimientos acontecieron en el domicilio del paciente: Chile, 60,7%; Argentina, 63,4%; Paraguay, 88%. Por el contrario, en Uruguay el 58,6% ocurrieron con el paciente hospitalizado. En Colombia se aprecia un ligero predominio de los exitus en hospitales. No obstante, es lógico afirmar que el 18,8% de certificados que no identifican el lugar de la defunción correspondan a óbitos extrahospitalarios. En Argentina el promedio de la tasa bruta de mortalidad por asma durante la década 1980 fue de 3,38 con valores mínimos en 1982 de 3,03 y máximos de 3,6 en 1987. Lo extenso de nuestro continente, las diferencias geográficas, climáticas y raciales y las grandes desigualdades económicas constituyen una población sumamente heterogénea que impone severas dificultades a la hora de hacer una evaluación global. Las tasas brutas de mortalidad en los diferentes países latinoamericanos muestran amplias variaciones que pueden atribuirse a diferentes causas: ambientales, raciales, socioeconómicas, médicas e inherentes a los métodos empleados para registrarlas. Las tasas de mortalidad por asma bronquial son elevadas en la mayoría de los países latinoamericanos estudiados, aun cuando esto requiera comprobaciones posteriores. Consideramos que los Ministerios de Salud de los países estudiados no prestan la debida atención al asma bronquial, y que es nuestro deber intentar modificar esta situación con el aporte de estudios epidemiológicos serios que justifiquen modificar la posición actual.

Palabras clave: Mortalidad por asma - Epidemiología del asma - Certificado de defunción y asma

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