Distribution of acute respiratory diseases in Brazil from 1996 to 2001, Brazil

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Abstract

Objective
Acute respiratory diseases - ARD, mainly pneumonias, are the most important cause of death among children under five years of age and are responsible for severe diseases among people over sixty years of age. This study aims to describe the main epidemiological characteristics of ARD cases notified by healthcare centers.

Methods
ARD patients' records from medical consultations at 100 public health care centers and hospitals were reviewed every week in the period from 1996 to 2001 and data was filled out on a specific form. Data was classified as pneumonia and not pneumonia according to age groups.

Results
During this period, 2,050,845 ARD cases were informed. May and June were the months with the largest number of cases. ARDs were more frequent among children aged one to four years old. The latter concentrated about twice the number of cases of other age groups. Pneumonias represented approximately 7.7% of the ARD cases.

Conclusions
The magnitude of ARD numbers may be observed and it should stimulate appropriate diagnosis, early treatment, and prevention, both in regard to the event itself and complications ensuing from it.

INTRODUCTION

Acute respiratory diseases (ARD) include a wide range of morbid events of different etiologies and distinct gravity which expose the respiratory tract to further risks. The main clinical manifestations of ARDs are coughing, difficulty breathing, sore throat, nasal discharge, and ear aches.[8] ARDs may be infectious diseases (common colds and pneumonias, for example) or non-infectious (such as allergic rhinitis and asthma), sometimes it is not possible to distinguish their origin.[7]

About 40% of the children who seek medical care have an acute respiratory infection (ARI). ARI, particularly pneumonia, is the main cause of death in children under five years of age, being responsible for two million infant deaths annually. It corresponds to 25% to 33% of the total number of deaths observed in the first five years of life.[6,11] Frequently, these deaths are attributed to other causes, when, in fact, they are the consequence of "occult" ARI.[11]

Both in developed and in developing countries, respiratory diseases represent a great proportion of infant morbidity and, therefore, exert great pressure on health care services.[10,11] ARDs are responsible for approximately one fifth of the hospital admissions in the *Sistema Único de Saúde (SUS)*[5] [Brazilian Public Health System].

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ARD also provoke severe diseases, frequent admissions and death among adults older than 60 years of age.[4] Adults presented from one to three episodes of ARD,[1] per year which provokes much work abstention and individual, enterprise and state national financial loss.[9] Unfortunately, particularly among children, ARDs are considered "normal", by the population as well as by the majority of health professionals.

Furthermore, ARD does not figure among the diseases of national compulsory notification. Thus, more precise data concerning the epidemiological trends of ARDs are scarce.[3] Since 1995, ARDs have been monitored by the municipal center of epidemiological surveillance in Fortaleza, Ceará, [situated in the Brazilian Northeast].

The objective of this study is to describe the main epidemiological characteristics of of acute respiratory disease cases informed by public health centers.

METHODS

The definition of ARD utilized for the purpose of data collection was "every inflammatory process, whether or not it is infectious, which affects the respiratory tract.[4] Therefore, it may occur in the nose, ears, pharynges, trachea, bronchi and lungs.[8]

Classification in pneumonia and non pneumonia was made according to the diagnosis registered in the report made by the physician who attended the case. In general, diagnosis of pneumonia in the outpatients health centers, was based on the patient history and physical examination, looking for the presence of unusually rapid breathing and retraction of rib muscles at each breath.[8]

In 1995, the notification of ARD was implemented. The number of notifying public health centers stabilized in 1996, having encompassed all public health care centers and those which had celebrated covenants

with *SUS*, including both emergency hospitals and outpatient services in Fortaleza. These health centers provided information for this study. According to estimates, 70% of Fortaleza's population is attended by *SUS*. Private clinics rarely inform health surveillance officials of any of the diseases included among those of national compulsory notification or of ARDs.

ARDs were consolidated weekly in a specific form filled out at the healthcare centers, based on the medical records registered by the attending physician, and distributed according to classification in non pneumonia or pneumonia and by age group (infants aged less than one year old, from one to four, from five to nine and older than 10 years old). The consolidated reports followed the same flux as the diseases of compulsory notification: each health center sent its records to the *Secretaria Executiva Regional (SER)* [Regional Executive Secretary] in which the health center was located, and each *SER* consolidated the data from its centers and sent it to the *Célula de Vigilância Epidemiológica da Secretaria Municipal de Saúde de Fortaleza (CEVEPI)* [Epidemiological Surveillance Cell of Department of Health of Fortaleza-Municipality], where the data from the six *SERs* were reunited.

At the *CEVEPI*, data was organized and stored in a databank utilizing the Excel program. There is a file for data from each *SER*, organized according to each epidemiological week.

Descriptive analysis of the cases of ARD attended in out-patient services between 1996 e 2001 was undertaken.

Information concerning pluviometrics was obtained from the *Fundação Cearense de Metereologia (Funceme)* [Ceara State Foundation of Meteorology].

RESULTS

From 1996 to 2001, 2,050,845 cases of ARD were

Table 1 - Cases of acute respiratory diseases by month and year. Fortaleza, CE, 1996-2001.

Year	1996	1997	1998	1999	2000	2001	Total
Jan	13,403	26,113	17,644	18,358	20,813	18,092	114,423
Feb	14,133	18,194	25,175	22,643	24,971	16,392	121,508
Mar	21,705	21,284	32,430	40,987	34,072	21,487	171,965
Apr	27,687	27,213	39,839	40,583	30,334	30,452	196,108
May	43,496	29,463	34,469	40,449	36,381	37,667	221,925
June	34,166	38,612	28,590	45,158	37,106	42,443	226,075
July	29,236	27,279	28,274	29,467	25,539	26,825	166,620
Aug	25,865	30,707	24,158	27,565	30,185	31,033	169,513
Sept	24,093	27,923	32,334	34,417	34,190	38,862	191,819
Oct	22,595	31,076	26,953	28,762	24,827	35,202	169,415
Nov	23,789	22,922	24,592	25,682	26,643	27,167	150,795
Dec	17,498	17,072	22,728	30,608	25,799	28,765	142,470
Total	305,875	317,858	337,186	384,679	350,860	354,387	2,050,845

Source: *Célula de Vigilância Epidemiológica da Secretaria Municipal de Fortaleza* [Epidemiological Surveillance Cell of the Department of Health of the Municipality of Fortaleza]

Table 2 - Cases of acute respiratory disease by year and classification, Fortaleza, CE, 1996-2001.

Year	1996	1997	1998	1999	2000	2001	Total
Pneumonia	26,662	19,281	22,243	33,000	30,375	27,109	158,670
Not pneumonia	279,213	298,577	314,943	351,679	320,485	327,278	1,892,175
Total	305,875	317,858	337,186	384,679	350,860	354,387	2,050,845

Source: *SMS/ COPS/ Célula de Vigilância Epidemiológica* [Epidemiological Surveillance Cell of the Department of Health of the Municipality of Fortaleza]

informed. In general, the months of May and June had the largest number of notifications, having presented an average of 36,978.7 cases in May and 37,679.2 cases in June. The months of the year which presented the smallest number of cases of ARD were January and February. From March until June, the number of cases tended to increase and, from then on, the tendency was to decrease (Table 1).

From 1996 to 1999, the number of cases of ARD tended to increase, the latter being the year with the largest number of notifications. A tendency towards stabilization was noted between 2000 and 2001. The general incidence of ARD demonstrated a small variation between 1997 and 2001, except for the year 1999, when a peak was observed.

It is not always possible to identify a correlation between pluviometric indexes and the number of cases of ARD: the increase in the number of cases just after the rain may be observed as well as the lack of any kind of correspondence with the rain (Figure).

A similar distribution may be a observed for both diseases of the superior respiratory tract and pneumonias, isolatedly and for ARDs among infants under one year of age.

From 1996 to 2001 the pneumonias represented, on the average, 7.7% of the cases of ARD notified, varying from 6.1%, in 1997, to 8.7%, in 1996 and in 2000 (Table 2).

Approximately 38.8% of the cases of ARD (797,677 cases) occurred among children aged one to four years old. The other age groups, including the one with children aged ten or older, are represented by roughly 20% of the cases. The greatest risk group was the one composed by infants under one year of age; the incidence among them was 1,115.7 cases for each thousand infants younger than one year of age. Among children aged one to four, the incidence of ARD cases was 516.2/1,000, among children ranging in age from five to nine years old it was 209.3/1,000 and among those over ten it was 35.4/1,000 (Table 3).

DISCUSSION

There was little variation in the incidence of ARD during the study period, except for the elevation in the number of cases in 1999, suggestive of a an epidemic in Fortaleza. The annual median of notifications during these six years was 341,808 cases, with a monthly average of 20,484 cases. If the distribution of cases were uniform among the 100 notifying centers, the average would be 205 cases per month. Thus, a physician would be necessary to attend theses cases, being that 70% of the cases attended by him would be ARDs. However, during the periods of higher incidence, the average number of cases would double, and the number of professionals attending these cases would have to be reformulated.

It was verified that the number of cases per month, on the average, begins to increase in March and to decrease from July onwards. This suggests that the behavior of the ARDs in the municipality of Forltaleza is different than that observed in the Southeast region of the country.[2,5]

The age groups utilized in this study represented a limitation for a more detailed analysis of ARD among the elderly. These age groups were defined for acute diarrheas and ARD during the cholera epidemic in the Northeast, when the greatest concern was early detection of cholera and monitoring ARD during in-
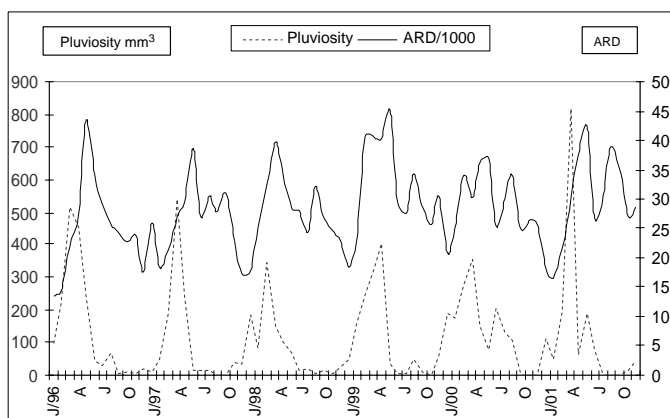
Source: Fundação Cearense de Metereologia (Funceme)/ Epidemiological surveillance cell of the Secretaria Municipal de Fortaleza

Figure - Cases of acute respiratory diseases and monthly as well as annual pluviosity, Fortaleza, Ce, 1996-2001.

Table 3 - Cases and incidence of acute respiratory diseases by year and age group, Fortaleza, CE, 1996-2001

Year	1996	1997	1998	1999	2000	2001	Total
Age group (years)				Cases			
<1	65,134	62,312	65,792	70,416	60,210	56.812	380.676
1 to 4	132,313	137,228	139,138	146,943	122,277	119.778	797.677
5 to 9	58,513	58,443	64,700	74,401	73,990	72.712	402.759
10 and +	47,993	58,203	65,586	90,741	92,069	102.111	456.703
Total	305,875	317,858	337,186	384,679	350,860	354.387	2.050.845
			Incidence per thousand inhabitants				
<1	1,608.7	1,501.5	1,553.4	1,629.5	1,366.2	1,265.4	1,115.7
1 to 4	721.5	730.1	725.4	750.8	612.6	589.0	516.2
5 to 9	255.3	248.8	269.9	304.2	296.8	299.8	209.3
10 and +	31.7	37.5	41.5	56.2	56.0	60.5	35.4
Global	155.6	157.8	164.0	183.4	164.1	162.6	123.4

Source: *SMS/ COPS/ Célula de Vigilância Epidemiológica* [Epidemiological Surveillance Cell of the Department of Health of the Municipality of Fortaleza]

fancy. By now, the most important age groups for this monitoring, could be re-evaluate taking into consideration the gravity which respiratory diseases may assume among older adults.

Data collected does not allow us to assess gravity and evolution of the patients, since these cases were not submitted to in-depth investigation and the great majority only received ambulatory care. The residential addresses of the patients is not registered and because of the mobility of the patients, who can seek care in any public health care center independent from the distance of their homes, cases distribution according to the location in which they were attended may not coincide withy their place of residence.

ARDs monitoring strategy need to be refined. It is possible that upon adequately filling out the information on diagnosis, within the *Sistema de Informação de Atendimentos Ambulatoriais (SAI-SUS)* [Ambulatory Care Information System], a more precise epidemiological picture will be revealed, without increasing the costs of ARDs and other diseases. While this goal has not yet been attained, it is necessary to improve the quality of information and analysis in order to improve planning of health interventions. This, in turn, will make it possible to take better care of these illnesses and to undertake prevention of the more serious diseases and their complications, as well as validation studies which make improvements possible.

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