Am. J. Trop. Med. Hyg., 67(5), 2002, pp. 490–491

SHORT REPORT: SEASONAL PATTERN OF RESPIRATORY SYNCYTIAL VIRUS IN A REGION WITH A TROPICAL CLIMATE IN SOUTHEASTERN BRAZIL

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Abstract. Among acute respiratory infections (ARIs), respiratory syncytial virus (RSV) is an important pathogen, especially in infants and preschool children. This study focused on RSV epidemiology in a region of southeastern Brazil with a tropical climate. A total of 406 nasopharyngeal secretion samples were taken from children less than five years of age with ARIs. Of these, 114 (28%) were RSV-positive. These samples were found in all age groups, but showed a higher prevalence in newborns. Infection with RSV was identified in 10 of the 12 months of the study period, but the majority (88.5%) of cases occurred from late summer to mid-fall.

Viruses are the principal etiologic agents of acute respiratory infections (ARIs), with respiratory syncytial virus (RSV) being most frequently observed, especially in cases of lower respiratory tract infections.[1–3] The main epidemiologic characteristic of RSV is its seasonality, with annual epidemics observed at regular intervals that vary according to the type of climate. In countries with a temperate climate, epidemics occur mainly in the winter, although they can begin in the fall and extend into early spring.[4–9] In southern Brazil, which has a predominantly temperate climate, RSV also produces epidemics in the winter months (June, July, and August) (Straliotto SM, unpublished data). However, the seasonality of RSV in the city of Rio de Janeiro, located in southeastern Brazil, occurs in the fall and early winter, thus preceding the outbreak in southern Brazil.[10,11] This seasonal pattern can be probably explained by the huge climatic diversity present in Brazil, which makes the country an ideal area for the study of RSV epidemiology. Our primary objective was to study the epidemiology of RSV in children with an ARI living in a region with a tropical climate.

This cross-sectional study was conducted between July 1997 and June 1998 in the metropolitan area of the city of Vitória, the capital of the state of Espírito Santo, located on the coast of southeastern Brazil. This region has a tropical, hot, and humid climate with a mean annual temperature of 24°C. Patients were enrolled from public medical services: one outpatient clinic and two hospitals. The nasopharyngeal secretion samples used in the study were collected by aspiration in the morning on a fixed weekday. Study inclusion criteria were 1) children less than five years old living in the study area; 2) a clinical presentation compatible with ARI and/or the presence of symptoms such as coryza, fever, cough, hyperemia of the oropharynx, wheezing, crackles, rales, rhonchi, moaning, intercostal or subcostal retraction, and cyanosis; and 3) a duration of disease less than eight days with the presence of nasopharyngeal secretions. The study was approved by the Institutional Review Board at the Biomedical Center/Federal University of Espírito Santo (Vitória, Brazil). All parents or guardians of patients were informed verbally about the study before providing consent for participation.

Confirmation of infection with RSV was done using an indirect immunofluorescence technique.[12] Statistical analysis was performed using SPSS (Chicago, IL) version 7.5 for Windows 95.[13]

During the 12 months of the study, 406 samples were collected. Of these, 170 (42%) were from children enrolled in an outpatient clinic, 156 (38%) from children seen in an emergency room, and 80 (20%) from hospitalized children (pediatric ward and intensive care unit). The prevalence of RSV was 28% (114 of 406). The RSV-positive cases were detected in all months except August and December. Most (88.5%) of these cases were detected in February, March, and April (Figure 1).

Infection with RSV was identified in all age groups. Among those less than one month of age, RSV was found beginning at the first week of age. The association between patient age and RSV infection was significant, with children 1–11 years of age having four times more RSV infections than those 1–4 years of age. Children less than 30 days of age had 11 times more RSV infections than children 1–4 years of age ($P < 0.001$) (Table 1). There was also an association between a diagnosis of bronchiolitis and RSV infection (odds ratio = 8.06, 95% CI = 4.95–13.1, $P < 0.001$).

Surprisingly, RSV was identified in 10 (except for August and December) of the 12 months of the study, with the majority (88.5%) of cases concentrated in February (summer), March, and April (fall). Typically, RSV is prevalent during the winter in regions with temperate climates. In regions with tropical and sub-tropical climates, the disease appears to be more prevalent in the rainy seasons.[3,14] Although uncommon, the yearly distribution of RSV found in our study has also been described in two other studies.[15,16] Similarly, the beginning of an epidemic during the summer was also reported in

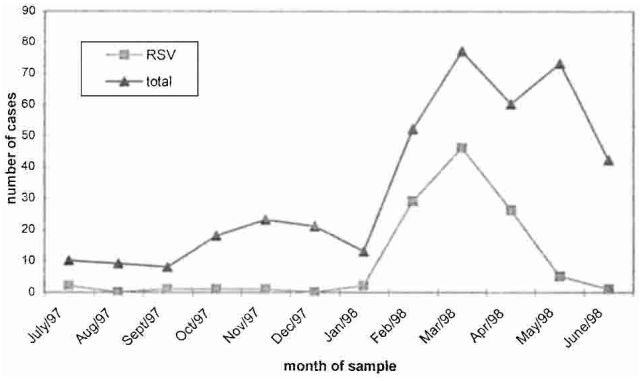

FIGURE 1. Monthly distribution of nasopharyngeal secretion samples examined and those positive for infection with respiratory syncytial virus (RSV).

TABLE 1
Age distribution of cases positive for respiratory syncytial virus (RSV)

Age	RSV		No. of samples tested	Odds ratio
	No. positive	%		
< 1 month	15	60	25	11.21
1–11 months	82	34.6	237	3.95
1–4 years	17	11.8	144	1.00
Total	114	28	406	

* χ^2 for Mantel-Haenszel linear trend = 36.5, degrees of freedom = 2, $P < 0.001$.

the border state of Rio de Janeiro[10] and in Louisiana in the United States.[17]

In relation to age, our study showed that the younger the patient, the higher the prevalence of RSV, especially in newborns (60%). The fact that we identified infection with RSV in individuals as young as one week of age with a clinical presentation of a lower respiratory tract disease serves as a warning to physicians that this is an unusual clinical presentation. In this age group, RSV disease has been described as being limited to the upper respiratory tract or showing nonspecific signs such as lethargy and difficulty in nursing.[18] Our results also support findings that RSV is the most common etiologic agent of bronchiolitis.[4]

Acknowledgments: We thank Dr. Maria Carmen Viana for performing the statistical analysis, and Michelle Boni, Bruno Alcuri de Souza, Mariza Bittencourt Lugon, Andressa Bonela Lopes, Renata Paes Andrade, and Renata de Almeida for help with data collection.

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