Age-Dependent Interactions Among Clinical Characteristics, Viral Loads and Disease Severity in Young Children with Respiratory Syncytial Virus (RSV) Infection

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BACKGROUND

- RSV is associated with significant morbidity in the inpatient and outpatient setting
- Differences in clinical presentation and viral loads (VL) according to age in young children with RSV infection, and their correlation with disease severity are not well defined.

OBJECTIVES

- To define age-dependent differences in demographic parameters, clinical presentation and RSV loads in children <2 years of age with mild RSV infection evaluated as outpatients versus those hospitalized with severe RSV infection.

METHODS

- Previously healthy children <2 years old with mild (outpatients) and severe (inpatients) RSV infection were enrolled between 2014-2018.
- Nasopharyngeal (NP) swabs were obtained for RSV typing and quantitation by real-time PCR targeting the N gene.
- Disease severity was defined by the need for hospitalization
- For analyses purposes patients were stratified by age in three distinct groups
  - 0-<3 months
  - 3-6 months
  - >6-24 months
- Multivariable analyses were performed to identify clinical and viral factors associated with severe disease.

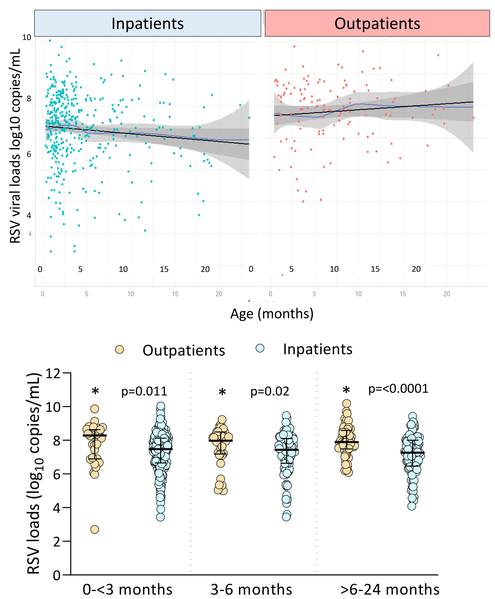
RESULTS

TABLE 1. Study Patients: Clinical Parameters

	Outpatients n=130	Inpatients n=404	*P* value
Age (months)	6.0 [3.2-10.1]	2.7 [1.5-5.7]	**<0.001**
Age groups			**<0.001**
<3 months	30 (23%)	222 (55%)	
3-6 months	38 (29%)	90 (22%)	
>6-24 months	62 (48%)	92 (23%)	
Sex (male)	66 (51%)	219 (54%)	0.54
Race			**<0.001**
White	63 (48%)	276 (68%)	
Black	49 (38%)	64 (16%)	
Other	18 (14%)	64 (16%)	
Breastfeeding	81/130 (62%)	166/360 (46%)	**0.002**
Daycare attendance	49/130 (38%)	90/360 (25%)	**0.009**
Smoke exposure	42/129 (33%)	128/360 (36%)	0.59

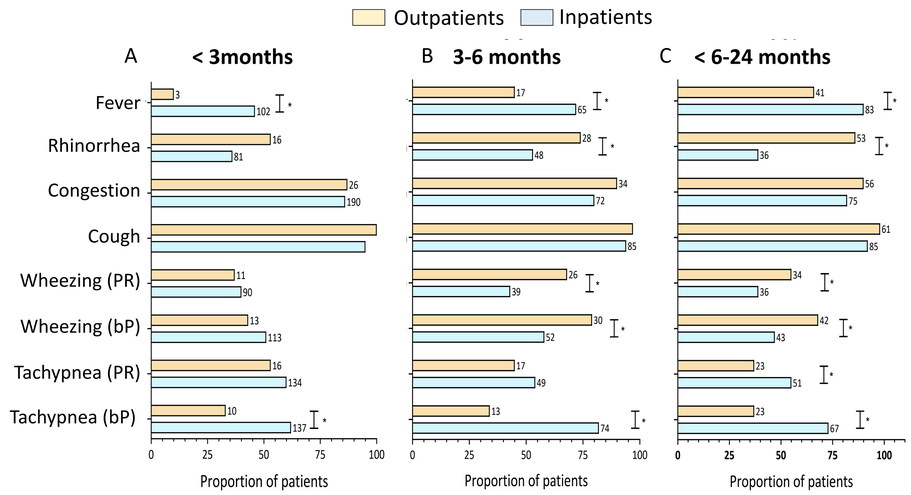
Categorical data are expressed as frequencies (%) and analyzed using Fisher or x2 test. Continuous data are expressed as median [25%-75% interquartile range] and analyzed using Man-Whitney rank test or Student t test. Values in bold indicate significant 2-sided *p* values.

FIGURE 1. RSV loads according to age and disease severity



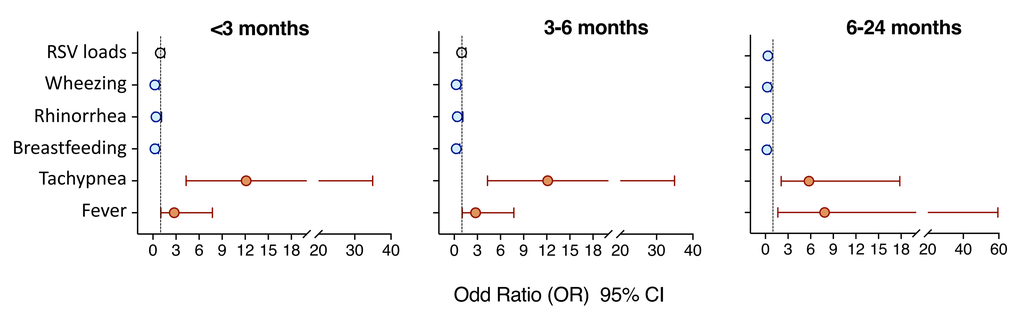
RSV loads in outpatients (orange) and inpatients (blue) in the Y axis and the three age groups in the X axis. Comparisons by Mann Whitney test.

FIGURE 2. Clinical presentation in children with RSV infection.



Relevant signs and symptoms were stratified in outpatients (orange) vs inpatients (blue) by age in **(A)** < 3 months, **(B)** 3 and 6 months, and **(C)** > 6 to 24 months of age. The Y axis represents the signs and symptoms in the two disease severity groups and the X axis the frequency of the specific symptom (%). Numbers next to bars represent the exact number of patients with that specific sign/symptom. Comparisons by Fisher exact test. Symbol (*) indicate significant 2-sided p values. PR: parental report; bP: by physician.

FIGURE 3. Adjusted odds of Hospitalization



CONCLUSIONS

- Age had a significant impact defining the interactions among VL, specific clinical manifestations and disease severity in children with RSV infection.
- These observations highlight the importance of patient stratification in the clinical setting when evaluating interventions against RSV.