

Dario Palhares\* and Lisiane S Ferreira

University of Brasilia, Brazil

Dates: Received: 13 May, 2016; Accepted: 19 July, 2016; Published: 25 July, 2016

\*Corresponding author: Dario Palhares, University of Brasilia, SQS 408 bl C ap. 307, Asa Sul. 70257-030, Brasilia, DF, Brazil, Tel: 55-61-3242 3638; E-mail: dariompm@unb.br

www.peertechz.com

ISSN: 2455-1759

Keywords: Anti-histaminic; Corticosteroids; Asthma; Ulnar deviation; Chronobiology

## Review Article

## Clinical Circadian Behaviour of Infantile Allergic Rhinitis

## Abstract

**Objectives:** In a week, not every day the patient with allergic rhinitis will have symptoms; also, in a year, not every month the patient will have complaints. Therefore, the clinical evaluation of allergic rhinitis in children should take in consideration the frequency of symptoms and the circadian cycle.

**Methods:** forty patients at an outpatient service of general pediatrics who had been diagnosed as presenting active allergic rhinitis were invited to fill up a questionnaire where the symptoms had to be registered at each period of the day, during the following 7 days.

**Results:** thirty patients completed the study. Each child presented a distinct pattern of weekly behavior, which was seen at the high values of standard deviations. The frequency of the symptoms were significantly reduced between midday and 16:00 hour.

**Conclusion:** the infantile allergic rhinitis presents a nitid circadian behaviour, being less active around midday. The registration of symptoms during a week revealed that there are patients with almost daily symptoms, but the majority of them present symptoms intermittently, and this information is useful for planning and monitoring the treatment.

## Introduction

In a retrospective study, Palhares observed that infantile allergic rhinitis symptoms are stronger at evening and in early morning and are milder around midday and early afternoon [1]. Further, in patients with mild allergic rhinitis, symptoms present irregularly with periods of amelioration and worsening. Thus, in a week, not every day the patient will have symptoms; also, in a year, not every month the patient will have complaints. Hence, allergic rhinitis is considered to follow both circadian and circannual variation [2].

Therefore, the clinical evaluation of allergic rhinitis in children should take in consideration the frequency of symptoms and the circadian cycle [3,4]. In the present paper, we have collated a questionnaire to evaluate the circadian behaviour of allergic rhinitis symptoms and to help in the clinical evaluation of the patients.

## Methods

This research was approved by the Committee of Ethics on Research of the Faculty of Medicine of University of Brasilia. This is a prospective study carried out at the outpatient service of General Pediatrics of University Hospital of Brasilia. The service is a center for secondary care that also attends to the demands of primary care. The patients reach the service either spontaneously or referred from the prompt-attendance service of the same hospital. We followed the guidelines given by ISAAC group (1992) to select the children presenting with symptoms of allergic rhinitis such as nasal obstruction and rhinorrhea [5-7]. Children with other diseases, under chronic medications or who had not returned with the filled questionnaire were excluded. Since the normal distribution is more evident with sample size of 30 or more, the study was carried out until this number was reached. At the end of the consultation, the parents who concurred in participating in the study were asked to complete a retrospective questionnaire about the time of worsening

and amelioration of the symptoms (Table 1). The questionnaire was prepared based on ISAAC and on Palhares [1,5,6]. They were also asked to complete a questionnaire where the symptoms have to be registered at each period of the day, during the following 7 days (Table 2). The descriptive retrospective data were expressed in simple proportion and the prospective data were compared by Student's t-test.

## Results

Forty children were considered for the study out of which 10 were excluded - 6 because they did not return in the following week (withdrawal), 2 because of incomplete filling of the questionnaire, 1 because presented only nocturnal snoring and 1 because the symptoms were completely relieved with cephalixin due to acute sinusitis.

Table 1: referred circadian behaviour (absolute number – percentage).

After wake-up	Amelioration: 16 (53%) Worsening: 14 (47%)
Along morning	Amelioration: 23 (77%) Worsening: 7 (23%)
Beginning of afternoon (up to 17:00)	Amelioration: 28 (93%) Worsening: 2 (7%)
Dusk (17:00 – 19:00)	Amelioration: 9 (30%) Worsening: 21 (70%)
Night	Amelioration: 9 (30%) Worsening: 21 (70%)
At bedtime	Amelioration: 5 (16%) Worsening: 25 (84%)
Awakening at pre-dawn	No: 13 (44%) Yes: 17 (56%) Time of awakening 00:00 – 02:00: 12 03:00 – 05:00 : 5

Out of 30 children included in the study, 20 were boys and 10 were girls. **Table 2** shows the distribution of age. Age varied from 1 to 10 years, but the most frequent age was of between two and half years and five years.

Data from the retrospective evaluation are shown in **Tables 1,3**. The majority of patients presented symptoms that lasted three

weeks or more. Nasal obstruction, rhinorrhea and cough were the frequently cited symptoms, out of which nasal obstruction was more common. Among the physical markers of allergy, Dennie-Morgan's eye crease and a pale or violet nasal mucosa were the most prevailing signs compared to ulnar deviation of medium finger (Najar's signal) [8] and signs of atopic dermatitis.

The retrospective data showed a circadian behavior along the day, where the period between midday and 16:00 was referred as a period of amelioration of symptoms, as well as the morning period after wake-up.

**Table 2** shows the frequency of symptoms reported by each patient along one week. In each period of the day, each patient could have presented, then, 0 to 7 events. Each child presented a distinct pattern of weekly behavior, which can be seen at the high values of standard deviations. We observed that the frequency of the symptoms were significantly reduced between midday and 16:00 hour. Though not statistically significant the frequency of the symptoms were more between 18:00 hour and bedtime.

## Discussion

Diagnosis of allergic rhinitis is primarily clinical, as there is no specific diagnostic test [5,6,8]. The allergic tests can only point out to an allergic condition. They cannot rule out a non-allergic rhinitis. In a clinical situation, a diagnosis of allergic rhinitis is usually made by ruling out infectious causes of rhinitis as non-allergic non-infectious rhinitis are considered rare in children [1,5].

In the present study, in addition to the clinical history the diagnosis of allergic rhinitis was corroborated by the presence of allergic markers such as sibilance and external signs of atopy – Dennie-Morgan's eye crease, atopic dermatitis, pale or violet nasal mucosa and ulnar deviation of medium finger [8-10]. We have not considered allergic salute and allergic crease as they are inconsistent presentations. Even so, there was one case whose diagnosis was changed to acute sinusitis, as the use of cephalexin completely suppressed the symptoms and the patient had never complained about nasal obstruction or rhinorrhoea before.

Comparing to the results of Palhares, the patients at outpatient service presented a different profile of main complaint; at prompt-attendance services, cough is the most common symptom during consultation, while at outpatients, the most common symptom was nasal obstruction, although cough was also present [1].

Prospective studies are more accurate than retrospective ones. In the present study, the comparison of retrospective data with prospective observation revealed that they were in accordance. To guide the treatment of some chronic diseases with subjective symptoms – such as migraine and benign vertigo – it is common to request the patient to fill a prospective questionnaire of symptoms.

Similarly, the prospective questionnaire used in the present study could help in the clinical practice. To those children with less symptoms, the treatment can be relied upon intermittent use of low dose anti-histaminics, while those with more frequent symptoms would need continuous treatment with higher dose drugs [3,10]. One of the paradigms of paediatric treatment is to use the less medication

**Table 2:** One week observation data (number of days when symptoms occurred).

	Gender	Age	After wake-up	Along morning	Beginning of afternoon (up to 17:00)	Dusk (17:00 to 19:00)	At bedtime	At pre-dawn
1	F	1y7m	1	3	3	3	2	6
2	F	2y3m	4	3	3	5	7	7
3	F	2y8m	0	2	0	3	5	7
4	F	2	4	4	1	1	5	1
5	F	3	2	3	2	4	4	0
6	F	3	0	3	2	7	3	0
7	F	4	4	1	3	1	7	3
8	F	4	1	1	2	1	2	0
9	F	5	4	4	3	4	4	5
10	F	7	7	5	4	5	7	7
11	M	1y4m	7	1	1	1	0	4
12	M	1y9m	2	1	3	4	4	0
13	M	2	5	2	0	3	7	4
14	M	2	6	7	5	5	5	4
15	M	2y6m	0	0	0	1	1	0
16	M	2y9m	4	7	6	6	6	4
17	M	3	7	7	6	6	5	3
18	M	3	2	0	2	2	7	2
19	M	4	4	7	5	6	3	0
20	M	4	5	3	6	7	7	7
21	M	4	7	7	3	7	7	7
22	M	4	0	0	0	7	7	7
23	M	5	3	2	0	1	0	1
24	M	5	5	3	5	6	4	6
25	M	5	4	2	1	0	0	6
26	M	6	6	6	3	7	6	7
27	M	6	6	6	0	7	6	0
28	M	7	7	7	2	1	7	7
29	M	8	4	1	0	1	6	3
30	M	10	0	0	6	2	3	6
Mean ± standard deviation of the frequency of symptoms in the week. Letters at right compare data at P<0.05 by Student's t-test			3,7 ± 2,4a	3,3 ± 2,5a	2,5 ± 2,0b	3,8 ± 2,4a	4,6 ± 2,3a	3,8 ± 2,8a

**Table 3:** Aspects of the patients studied (absolute number – percentage).

<b>Gender</b>	<b>Female: 10 (34%) Male: 20 (66%)</b>
<b>Age</b>	1 to 3 years: 14 (47%) 4 to 6 years: 12 (40%) 7 to 10 years: 4 (13%)
<b>Duration of symptoms until the consultation</b>	1 to 3 weeks: 6 (20%) 1 to 6 months: 10 (34%) > 6 months: 14 (46%)
<b>Symptoms at main complaint</b>	Nasal obstruction (diurnal): 14 (46%) Cough: 11 (36%) Rhinorrhoea: 6 (20%) Nocturnal snoring: 9 (30%)
The sum exceeds 100% because more than one symptom could be present	
<b>Presence of symptoms</b>	Sneeze: 13 (43%) Nasal obstruction: 26 (86%) Aqueous rhinorrhoea: 24 (80%) Cough: 21 (70%) Past of sibilance: 12 (40%)
The sum exceeds 100% because more than one symptom could be present	
<b>Presence of signs of atopy</b>	Nasal mucosa Hyperaemia: 5 (3%) Pale: 15 (50%) Pinkish: 4 (13%) Violet:
The sum exceeds 100% because more than one symptom could be present	Hypertrophy of nasal turbinates: 10 (34%) Dennie-Morgan's eye crease: 17 (56%) Ulnar deviation of medium finger (Najar's signal): 9 (30%) Cutaneous atopy: 11 (36%) White rhinorrhoea: 12 (40%)
<b>Medications in use</b>	Amoxicillin: 2 (6%) Nasal budesonide (intermittent): 2 (6%) Anti-histaminics: 4 (13%) Inhaled phenoterol: 1 (3%)

as possible at the lowest dosage during the shortest period as possible. Using the prospective questionnaire from our study, a doctor can have a general overview about the behaviour of the rhinitis of the given child and the treatment can be designed accordingly.

As a conclusion, the infantile allergic rhinitis present a nitid circadian behaviour, being less active around midday. Also, the registration of symptoms during a week revealed that there are patients with almost daily symptoms, but the majority of them present symptoms intermittently.

### Acknowledgements

We thank the Indian company Content Concepts for English review.

### References

- Palhares D (2009) Aurora and crepuscule in infantile allergic rhinitis. *Ped Mod* 45: 186-191.
- Reinberg A, Gervais P, Levi F, Smolensky M, Cerro L, et al. (1988) Circadian and circannual rhythms of allergic rhinitis: an epidemiologic study involving chronobiologic methods. *J Allergy Clin Immunol* 114: 51-52.
- Nakao A, Nakamura Y, Shibata S (2015) The circadian clock functions as a potent regulator of allergic reaction. *Allergy* 70: 467-473.
- Pritchett A, Reddy AB (2015) Circadian clocks in the hematologic system. *J Biol Rhythms* 30: 374-388.
- International Study of Asthma and Allergy in Childhood. ISAAC Manual. Auckland: ISAAC Coordinating Committee; 1992.
- Tintori SM, Carvalho MD, Solé D, Ocebrecch L, Antoniassi PC, et al. (2013) Prevalence of asthma and allergic diseases in Brazilian school children aged 12 to 15 years in the city of Maringá, Paraná State, Brazil. *Rev Bras Med* 70: 22-30.
- Geraldini M, Neto HJCh, Riedi CA, Rosário NA (2013) Epidemiology of ocular allergy and co-morbidities in adolescentes. *J Ped. (Rio J)* 89: 354-360.
- Najar HCF (2000) Najar's signal. *Rev Bras Med* 57: 908-911.
- Mendes AIS, Wandalsen GF, Solé D (2012) Objective and subjective assessments of nasal obstruction in children and adolescents with allergich rhinitis. *J Ped. (Rio J)* 88: 389-395.
- Bousquet J, Khaltaev N, Cruz AA, Denburg J, Fokkens WJ, et al. (2008) Allergic Rhinitis and its Impact on Asthma (ARIA). *Allergy* 63: 8-160.