



EDITORIAL

**Increasing the knowledge base of ocular allergy epidemiology<sup>☆,☆☆</sup>**

**Aumentando a base de conhecimento da epidemiologia da alergia ocular**

**Leonard Bielory**

*MD. Allergy and Asthma Center Medicine, Pediatrics & Ophthalmology, Rutgers University Center for Climate Prediction, New Jersey, USA*

In this issue of the *Jornal de Pediatria*, Geraldini et al.<sup>1</sup> attempt to add another piece to the puzzle in order to provide additional insight into ocular symptoms associated with allergies. They used a validated instrument that focuses on the adolescent population in school with more than three episodes of ocular itching, who are more likely to have allergic rather than infectious etiologies, although it may also include a subpopulation with dry eye syndrome. The anterior surface of the eye is not only exposed to allergens such as mold spores and pollen, but also interfaces with environmental factors such as temperature, humidity, cigarette smoke, and other pollutants, which can also generate symptoms of itching, tearing, and redness that are common to allergic conjunctivitis and dry eye syndromes.<sup>2</sup>

The authors designed their study to parallel the International Study of Asthma and Allergy in Childhood (ISAAC), which provided an interesting overview of the allergy-related symptoms, and grouped them as nasal, respiratory, and ocular allergies. One of the most unusual findings in their study was the increased correlation of ocular symptoms with asthma (more than nasal), particularly

because we normally think of the condition as a symptom associated with rhinoconjunctivitis. Commonly, the information regarding ocular symptoms are buried within the allergic rhinitis studies; however, since the early 1990's, studies have started to recognize the ocular domain of allergic rhinitis, terming the situation where the ocular complaints exceed the nasal symptoms as 'conjunctivorhinitis'.<sup>3</sup> The authors noted that ocular symptoms further increased when asthma and nasal allergies were combined, suggesting that some of the ocular symptoms can occur alone, and thus may reflect a nonallergic form of conjunctivitis such as dry eye or 'urban eye allergy'.<sup>4-6</sup> The severity associated with ocular symptoms in comparison to nasal allergy symptoms has commonly been overlooked, but with recent surveys such as Allergies Across America and others, ocular allergies rank a very close second, and at times may supersede the primary complaints of nasal congestion.<sup>7</sup> Another study of early adolescent schoolchildren (ages 12–13; n = 396) performed in Sweden using a questionnaire with a subsequent interview estimated the cumulative prevalence of allergic conjunctivitis to be 19%, while the prevalence of the allergic rhinoconjunctivitis combination was 18%, suggesting a co-morbidity of approximately 92%, as well as the potential of ocular symptoms existing alone (8%).<sup>8</sup> Other studies on allergic conjunctivitis based on the ISAAC study reflected that even in developing countries such as Uganda, where allergy has a low prevalence in the ISAAC study, allergic conjunctivitis was reported in as high as 20% of the population.<sup>9</sup> Specifically in randomly selected Nigerian early adolescent children (ages 13–14; n = 3,058),

DOI of refers to article:

<http://dx.doi.org/10.1016/j.jpmed.2013.01.001>

<sup>☆</sup> Please cite this article as: Bielory L. Increasing the knowledge base of ocular allergy epidemiology. *J Pediatr (Rio J)*. 2013;89:330–1.

<sup>☆☆</sup> See paper by Geraldini M. et al. in pages 354–60.

E-mail: [drlbielory@gmail.com](mailto:drlbielory@gmail.com)

the cumulative prevalence rates of wheezing, rhinitis other than common cold, and symptoms of eczema were 16%, 54% and 26%, respectively. However, rhinitis associated with itchy eyes (allergic rhinoconjunctivitis) was reported by 39% of the school children, i.e. 80% of those patients reported to have rhinitis.<sup>10</sup> The ISAAC study demonstrated that the prevalence of rhinitis with itchy-watery eyes (rhinoconjunctivitis) varied across centers from 1% to 15% in children aged between 6 and 7 years and from 1% to 39% in adolescents aged between 13 and 14 year.<sup>11</sup> It is not clear whether the prevalence of rhinitis and conjunctivitis were similar or whether one symptom was more common than the other. However, these studies have not looked at the association with asthma, a unique observation of the study by Geraldini et al.

One study examined the prevalence of ocular allergy with asthma; the prevalence and severity of symptoms of self-reported hay fever were assessed in 509 Swiss symptomatic patients not currently receiving treatment who sought medical assistance during the 1994 pollen season. Conjunctivitis was diagnosed in 93% of cases (isolated in 8%) and rhinitis in 92% (isolated in 7%), and 24% reported active asthma symptoms. The severity of the asthma symptoms was mild in 44%, moderate in 48%, and severe in 8%. When the main symptomatology of hay fever (excluding asthma) was taken into account (the diagnosis with the severest symptomatology), 22% of patients suffered predominantly from conjunctivitis, 25% from rhinitis, and 53% from both.<sup>12</sup>

The authors provided a more detailed look at ocular symptoms in a particular age group that had previously been reported in the U.S. National Health and Nutrition Examination Survey (NHANES), in which various questions regarding ocular, nasal and respiratory complaints were also assessed, along with skin testing in a subset of participants of all age groups. That study included skin testing for several common seasonal and perennial allergens,<sup>13</sup> but did not use the same questions as the ISAAC study. Additional studies are needed in order to further appreciate the overlap of the eye allergic and non-allergic disorders of the anterior surface in different age groups. This epidemiologic study of ocular allergy will also provide some insight on the prevalence of ocular symptoms related to changes in the tear biofilm including increased concentrations of various allergic mediators and solutes further increasing tear osmolarity, which are used as a marker of dry eye syndromes. Dry eye disorders are thought to be uncommon in the adolescent population, but they clearly increase with exposure to pollutants and cigarette smoke at any age.<sup>14,15</sup>

Interestingly, in various studies attempting to classify the various forms of ocular allergy, there is always a pool of undiagnosed or unresponsive patients. Some authors call for an improved understanding of disorders of the anterior ocular surface.<sup>16</sup>

Thus, pieces of a puzzle related to ocular allergy that started to take shape in the 1990's, when an increased focus on ocular allergy as a separate entity started to evolve with research and development in the U.S. pharmaceutical

industry,<sup>3</sup> continue to develop with greater awareness. This provides an increasing momentum to further define the condition in different populations, age groups, and environments with exposure to different allergens and pollutants, but does provide a signal to us all!

A condition cannot be treated if it is not acknowledged!

## Conflicts of interest

The author declares no conflicts of interest.

## References

- Geraldini M, Chong Neto HJ, Riedi CA, Rosário NA. Epidemiology of ocular allergy and co-morbidities in adolescents. *J Pediatr (Rio J)*. 2013;89:354–60.
- Hom MM, Nguyen AL, Bielory L. Allergic conjunctivitis and dry eye syndrome. *Ann Allergy Asthma Immunol*. 2012;108:163–6.
- Bielory L. Allergic conjunctivitis: the evolution of therapeutic options. *Allergy Asthma Proc*. 2012;33:129–39.
- Bielory L. Ocular allergy and dry eye syndrome. *Curr Opin Allergy Clin Immunol*. 2004;4:421–4.
- Bielory L. Vasomotor (perennial chronic) conjunctivitis. *Curr Opin Allergy Clin Immunol*. 2006;6:355–60.
- Leonardi A, Lanier B. Urban eye allergy syndrome: a new clinical entity? *Curr Med Res Opin*. 2008;24:2295–302.
- Stull DE, Schaefer M, Crespi S, Sandor DW. Relative strength of relationships of nasal congestion and ocular symptoms with sleep, mood and productivity. *Curr Med Res Opin*. 2009;25:1785–92.
- Hesselmar B, Aberg B, Eriksson B, Aberg N. Allergic rhinoconjunctivitis, eczema, and sensitization in two areas with differing climates. *Pediatr Allergy Immunol*. 2001;12:208–15.
- Kamali A, Whitworth JA, Ruberantwari A, Mulwany F, Acakara M, Dolin P, et al. Causes and prevalence of non-vision impairing ocular conditions among a rural adult population in sw Uganda. *Ophthalmic Epidemiol*. 1999;6:41–8.
- Falade AG, Olawuyi F, Osinusi K, Onadeko BO. Prevalence and severity of symptoms of asthma, allergic rhino-conjunctivitis and atopic eczema in secondary school children in Ibadan, Nigeria. *East Afr Med J*. 1998;75:695–8.
- Bousquet J, Van Cauwenberge P, Khaltaev N, Aria Workshop Group; World Health Organization. Allergic rhinitis and its impact on asthma. *J Allergy Clin Immunol*. 2001;108: S147–334.
- Wüthrich B, Brignoli R, Canevascini M, Gerber M. Epidemiological survey in hay fever patients: symptom prevalence and severity and influence on patient management. *Schweiz Med Wochenschr*. 1998;128:139–43.
- Singh K, Axelrod S, Bielory L. The epidemiology of ocular and nasal allergy in the United States, 1988-1994. *J Allergy Clin Immunol*. 2010;126, 778-83.e6.
- Sahai A, Malik P. Dry eye: prevalence and attributable risk factors in a hospital-based population. *Indian J Ophthalmol*. 2005;53:87–91.
- Wolkoff P. Ocular discomfort by environmental and personal risk factors altering the precorneal tear film. *Toxicol Lett*. 2010;199:203–12.
- Stern ME, Siemasko KF, Niederkorn JY. The Th1/Th2 paradigm in ocular allergy. *Curr Opin Allergy Clin Immunol*. 2005;5:446–50.