Illness perception, mood and coping strategies in allergic rhinitis: are there differences among Allergic Rhinitis and its Impact on Asthma (ARIA) classes of severity?*

Fulvio Braido[1], Ilaria Baiardini[1], Nicola Scichilone[2], Antonino Musarra[3], Stefania Menoni[4], Erminia Ridolo[5], Federica Gani[6], Valerio Pravettoni[7], Giselda Colombo[8], Mariangiola Crivellaro[9], Gian Enrico Senna[10], Federica Fumagalli[11], Oliviero Rossi[12], Giorgio W. Canonica[1]

[1] Allergy and Respiratory Diseases Clinic, DIMI, University of Genoa, IRCCS AOU San Martino-IST, Genova, Italy

[2] Dipartimento Biomedico di Medicina Interna e Specialistica, University of Palermo, 'Villa Sofia-Cervello' Hospital, Palermo, Italy

[3] Allergy Unit, National Healthcare System, Reggio Calabria, Italy

[4] University of Genoa, Biostatistic Unit, Department of Health Science, Genoa, Italy

[5] Department of Clinical and Experimental Medicine, University of Parma, Parma, Italy

[6] Allergy Unit, Respiratory Diseases Division, A.O.U. San Luigi , Orbassano, Torino, Italy

[7] Clinical Allergy and Immunology Unit, Foundation Ospedale Maggiore Policlinico, Mangiagalli e Regina Elena, IRCCS, Milan, Italy

[8] Allergy and Immunology Department, IRCCS Fondazione San Raffaele del Monte Tabor, Milan, Italy

[9] Servizio di Allergologia Dipartimento di Medicina Ambientale e Salute Pubblica, Università di Padova, Padova, Italy

[10] Allergy Service, Verona Major Hospital, Verona, Italy

[11] ASL 2 Savonese, Savona, Italy

[12] Department of Biomedicine, AOUC, University of Florence, Florence, Italy

Rhinology 52: 66-71, 2014

DOI:10.4193/Rhino13.040

***Received for publication:**

April 16, 2013

Accepted: September 2, 2013

Abstract

Background: This study was designed to assess if illness perception, mood state and coping strategies differ according to allergic rhinitis (AR) persistence and severity.

Methods: Illness perception, mood profiles, coping behaviors and rhinitis symptoms were assessed by means of validated tools in patients classified according to the Allergic Rhinitis and Its Impact on Asthma (ARIA) guidelines.

Results: Two hundred and thirty-one patients underwent data analysis. No difference in age, sex, socio-economic status, smoking habits was detected comparing patients according to AR severity, duration or 4 ARIA classes. Patients with intermittent AR reported higher scores than those with persistent AR in confusion–bewilderment of Profile of Mood States (POMS); patients with moderate/severe rhinitis had significantly higher scores than those with mild rhinitis in T5SS, Identity and Consequences. No differences were detected in all assessed outcomes in the 4 ARIA classes.

Conclusions: The patient's perspective about AR is independent of persistence and severity of symptoms. This may explain why AR remains under-diagnosed and under-treated, even in its most severe forms. Self-management plans should consider the patient's perspective.

Key words: rhinitis, ARIA, Patient Reported Outcomes

Introduction

Allergic rhinitis (AR) is a common disease worldwide [(1)], with prevalence rates ranging between 23 and 30% in Europe [(2,3)] and between 12 and 30% in the United States [(4)]. The Allergic Rhinitis and Its Impact on Asthma (ARIA) recommendations have proposed to classify AR as intermittent and persistent on

the basis of symptoms duration, while disease severity has been graded as "mild" or "moderate/severe" depending on the impact of rhinitic symptoms on the quality of sleep, daily activities/sport leisure, work productivity/school performance and occurrence of troublesome symptoms [5]. This classification has been validated through surveys in primary care [6,7], showing that persistence and severity are two separate, and possibly independent, components of the same disease [8]. The above observations have led to infer that this classification may better reflect the patients' needs, thus favoring the optimal disease management. In this respect, large cross-sectional studies showed that in rhinitics classified according to the ARIA criteria [5], severity of the disease had a much greater impact on Patients Reported Outcomes (PROs), such as Health Related Quality of Life (HRQoL), daily activities, work performance and sleep than persistence of the disease [9-11].

Despite the importance of nasal symptoms in affecting quality of life of individuals with AR, the disease still remains underdiagnosed and under-treated [12-14]. In this scenario, it is plausible to postulate that, among the factors influencing this unsatisfactory disease management, other unexplored PROs may play a relevant role [15-16]. This study was designed to assess if illness perception, mood state and coping strategies differ according to AR persistence and severity.

Materials and methods

Study design

This cross-sectional, observational study was performed on a population of Italian patients scheduled for a follow-up visit due to AR. Subjects were recruited from the Allergy and Respiratory Departments of six Italian centers in a two-month period starting in spring 2012. The study consisted of the self-completion of PROs questionnaires followed by the clinical assessment, and was conducted in a single visit. The study does not provide for a control group, due to the characteristics of the questionnaires administered: as a matter of fact, whereas COPE and POMS can be used with healthy subjects, the IPQ-R makes specific reference to the presence of an illness in each item.

Once written informed consent to participate in the study was obtained, patients waiting for their visit were invited by the nursing staff to fill in validated questionnaires, specifically aimed at investigating illness perception, mood state and coping behaviours.

All patients suffering from AR for at least one year were asked to participate in the study. Duration and severity of AR were assessed following ARIA classification [5]. Patients had to fulfill the following inclusion criteria: adult age (range: 18–75 years), comprehension of spoken and written Italian, availability to participate in the study (informed consent signature). Exclusion criteria were: concomitant asthma, occurrence of nasal polyps and/or nasal septum deviation, presence of major anatomical disorders as assessed by anterior rhinoscopy or nasal endoscopy, pregnancy, impaired cognitive functions, visual-auditory deficits, and clinical conditions incompatible with questionnaire completion. The study was approved by the Ethics Committee of the Azienda Ospedaliero-Universitaria San Martino of Genoa.

Outcome measures

PROs assessment

While waiting for the clinical assessment, each patient was invited to complete the following questionnaires in random order. An estimated time of thirty minutes was given to fill in the questionnaires.

The Illness Perception Questionnaire (IPQ-R) assesses people's beliefs and understanding of their illness. It consists of 2 parts: the first part explores the identity factor and describes the presence of symptoms complained by the patient during the disease as well as the identification, by the patient himself, of the potential association between each of these symptoms (pain, sore throat, nausea, fatigue, weight loss, stiff joints, sore eyes, breathlessness, headache, upset stomach, sleep disturbances, dizziness and loss of strength) and the disease. The second part of the IPQ-R investigates the following items: consequences, timeline acute/chronic, timeline cyclical, coherence, personal control, treatment control and emotional representation. The questionnaire, applicable to all disease conditions, does not have a cutoff or a normal reference value, but it is analysed through the comparison between groups [17].

The Profile of Mood States (POMS) [18] questionnaire is a well-established, factor-analytically derived measure of psychological distress [19,20]. It consists of 58 adjectives to which patients have to answer rated on a five-point scale (0 = not at all to 4 = extremely) and provide a global index of stress (total score) and six factorial scores: tension–anxiety, depression–dejection, anger–hostility, vigour–activity, fatigue–inertia, and confusion–bewilderment. The scores, gained for each scale, are normalized to 50 and a SD of 10.

The Coping Orientations to Problem Experienced (COPE) questionnaire is a self-report instrument containing 60 items, each of which describes a coping behaviour [21]. The questionnaire was developed within the theoretical constructs of stress and behavioral self-regulation [22]. Patients are required to rate their answer on a 4-point scale, ranging from 1 (generally do not use) to 4 (generally use to a large extent). Fifteen coping strategies (primary factors) have been identified and subsequently grouped into 4 secondary factors [21]. A validated Italian version is available; this version has shown good psychometric properties that confirm the primary and secondary factors extracted from the English version [23,24].

Clinical assessment

Nasal and ocular symptoms were assessed using the Total 5

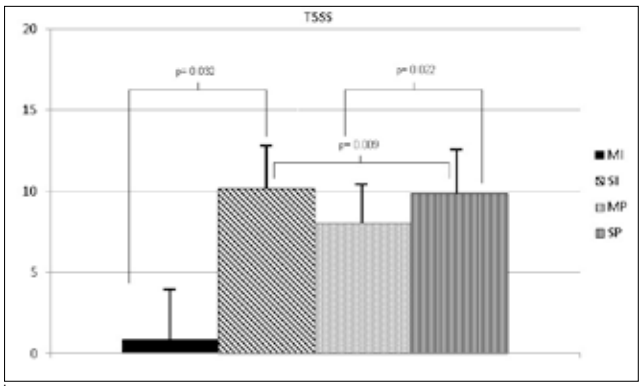

Figure 1. Difference in T5SS among ARIA classes.

Symptom Score (T5SS), which measures five symptoms: rhinorrhea, nasal itching, sneezing, nasal congestion and ocular itching. Symptoms are rated using the following scale: 0, no signs/symptoms; 1, mild (easily tolerated); 2, moderate (bothersome but tolerable); 3, severe (hard to tolerate, interferes with activity or sleep). The T5SS is derived from the sum of the five individual symptoms scores (range 0–15).

Patients were included in the statistical analysis on the basis of clinical data completeness and/or missing answers <5% in the PROs questionnaires.

Statistical analysis

Descriptive analyses for qualitative variables included number and percentage, whereas quantitative variables were analyzed in terms of mean value, standard deviation, and median and extreme values.

Although some of the variables are normally distributed, others are not. We therefore chose to use nonparametric statistics for all variables. The Kruskal-Wallis test with Bonferroni-Dunn post hoc analysis were used.

Results

A total of 242 eligible patients were invited to participate in the study; 2 refused and 9 were excluded from the analysis due to data incompleteness or missing questionnaire answers (< 5%), leaving 231 in the final analysis group. The demographical and clinical characteristics of the patients are summarized in Table 1 and Table 2, respectively. Mild intermittent (MI) rhinitis was diagnosed in 32 patients (13,85%), mild persistent (MP) rhinitis in 38 (16,45%), moderate/severe intermittent (SI) rhinitis in 30 (12,99%) and moderate/severe persistent (SP) rhinitis in 131 (56,71%). No difference in age, sex, socio-economical status, smoking habits, or AR treatment was detected comparing patients according to AR severity and duration, nor between the 4 ARIA classes ($p > 0.05$ in all analyses).

Looking at the disease duration, no significant differences in

Table 1. Demographic characteristics of the subjects included in the final analysis group (n= 231).

Demographic characteristics		
Sex, n (%)	Males	110 (47.6%)
	Females	121 (52.4%)
Age, yrs (mean ± SD)	34 ± 11.6	
Education	Primary school	4 (1.7%)
	Secondary school	31 (14.29%)
	High school	122 (52.8%)
	Academic degree	20 (8.7%)
	Postgraduate	52 (22.5%)
Smoking	Smoker	71 (30.74%)
	Non smoker	121 (52.38%)
	Former smokers	39 (16.88%)

Table 2. Clinical characteristics of the subjects included in the final analysis group (n= 231).

Clinical characteristics		
Rhinitis duration	Intermittent	110 (47.6%)
	Persistent	121 (52.4%)
Rhinitis severity	Mild	70 (30.30%)
	Moderate severe	161 (69.70%)
Pharmacologic therapy	yes	124 (53.68%)
	no	107 (46.32%)
Type of treatment	Intranasal steroids	41 (33.06%)
	Antihistamines	105 (84.68%)
	Vasoconstrictors	4 (3.23%)
	Antileukotrienes	1 (0.81%)

Table 3. Comparison of coping strategies assessed by COPE among ARIA classes.

COPE	Mild intermittent (MI) (n=32, 13,85%)	Moderate-severe intermittent (SI) (n=38, (16,45%)	Mild persistent (MP) (n=30, 12,99%)	Moderate-severe persistent (SP) (n=131, (56,71%)	Kruskal-Wallis	Bonferroni-Dunn post hoc analysis			
						MI/SI	MI/MP	MP/SP	SI/SP
Positive reinterpretation and growth	10,88 (2,25)	11,87 (2,49)	11,43 82,89)	11,89 (2,29)	0,433	NS	NS	NS	NS
Mental disengagement	8,23 (2,63)	8,87 (2,99)	7,93 (2,07)	7,81 (2,21)	0,564	NS	NS	NS	NS
Focus on and venting emotions	8,65 (2,38)	8,26 (2,30)	8,43 (2,84)	8,30 (2,60)	0,837	NS	NS	NS	NS
Use of instrumental social support	9,31 (3,07)	10,29 (2,33)	9,80 (2,63)	9,77 (2,77)	0 ,576	NS	NS	NS	NS
Active coping	10,73 (2,03)	10,65 (2,33)	11,07 (2,77)	10,99 (2,15)	0,772	NS	NS	NS	NS
Denial	5,96 (2,20)	6,17 (2,21)	6,13 (1,98)	5,58 (1,91)	0,288	NS	NS	NS	NS
Religious coping	7,57 (2,15)	6,83 (2,82)	7,29 (3,12)	7,15 (3,51)	0,863	NS	NS	NS	NS
Humor	7,42 (2,30)	7,35 (2,87)	7,73 (2,78)	6,88 (2,50)	0,381	NS	NS	NS	NS
Behavioral disengagement	6,27 (1,95)	6,22 (2,29)	6,03 (1,97)	5,76 (2,09)	0,445	NS	NS	NS	NS
Restraint	9,12 (2,50)	9,30 (2,49)	9,20 (2,77)	9,10 (2,34)	0,948	NS	NS	NS	NS
Use of emotional social support	8,42 (2,85)	9,04 (3,17)	8,97 (2,80)	8,59 (2,88)	0,774	NS	NS	NS	NS
Substance use	4,58 (2,37)	4,87 (2,14)	4,90 (1,92)	4,16 (0,65)	**0,007**	NS	NS	NS	NS
Acceptance	9,62 (2,53)	9,91 (2,97)	9,60 (2,54)	9,50 (2,66)	0,953	NS	NS	NS	NS
Suppression of competing activities	8,46 (2,47)	9,95 (2,08)	9,20 (2,67)	8,57 (2,37)	0,109	NS	NS	NS	NS
Planning	9,85 (3,11)	11,35 (3,2)	11,37 (3,48)	10,65 (2,91)	0,249	NS	NS	NS	NS

terms of questionnaires scores were found, with the exception of the domain confusion–bewilderment of POMS, in which patients with intermittent rhinitis reported higher scores than those recorded in patients with persistent disease (50.88 vs. 46.67, respectively; $p = 0.02$). As for disease severity, patients with moderate/severe rhinitis had significantly higher scores than those with mild rhinitis in T5SS (10 vs. 7.97; $p < 0.001$), as expected. Interestingly, subjects with more severe disease showed higher scores in two IPQ-R domains, that is, Identity and Consequences (3,69 vs. 2.67, $p = 0.02$, and 13.54 vs. 12.08, $p = 0.04$; severe vs. mild AR, respectively).

No differences were detected in coping strategies, neither between intermittent and persistent rhinitis, nor between mild and moderate to severe rhinitis (data not shown).
As regards T5SS, differences emerged among ARIA classes (MI vs. SI, $p = 0.032$; MP vs. SP, $p = 0.022$; SI vs. SP, $p = 0.009$, Bonferroni correction) (Figure 1), while no differences in all assessed PROs (IPQ-R, POMS and COPE) in the 4 ARIA classes were found ($p > 0.05$, Bonferroni correction) (Figure 2, Figure 3 and Table 3). No difference in T5SS, IPQ-R, POMS and COPE was detected comparing treated and untreated patients ($p > 0.05$ in all analyses).

Discussion

The current study was carried out in a large number of patients with a diagnosis of AR without concomitant asthma referring to allergists. The results of the study suggest that symptoms severity and duration do not affect the way in which the disease is perceived, nor the levels of subjective distress. Moreover, the copying strategies adopted by the patient do not vary according to the disease severity. In other words, the patient's perspective about AR is not related to persistence and severity of symptoms. This may explain why AR remains under-diagnosed and under-

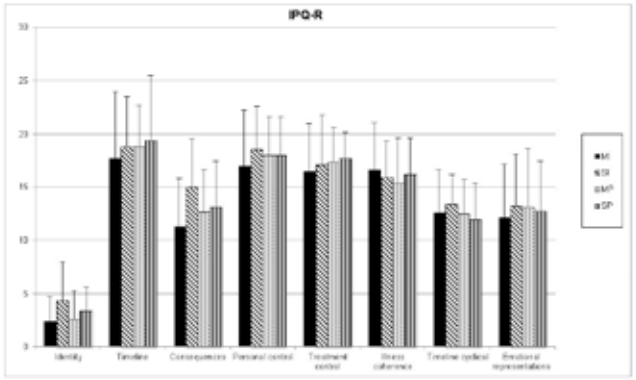

Figure 2. Difference in IPQ-R scores among ARIA classes.

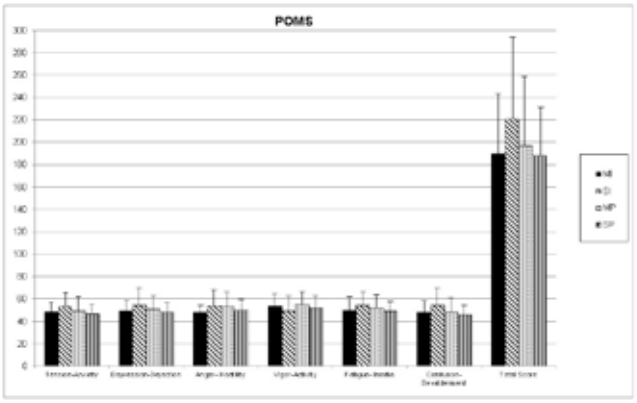

Figure 3. Difference in POMS scores among ARIA classes.

treated, even in its most severe forms. To the best of our knowledge, this is the first study describing illness perception, stress and coping in patients with AR without concomitant asthma using ARIA criteria in a large population of patients consulting a specialist.

As previously reported in large studies [9-11, 25], the majority of patients had persistent symptoms (73%), and AR of moderate-severe degree (70%). Considering the ARIA classification, no significant differences were detected in PROs among the four levels of severity, except for the symptoms. This was expected, since symptoms are incorporated into AR classification [8]. Our results further confirm that patients suffering from severe symptoms tend to consult a specialist [11,26,27]. However, almost half of our patients were not currently treated for AR. This is comparable with findings from other authors [10,25]. It has been underlined [9-11] that the severity of AR has a greater impact on PROs such as HRQoL, symptoms, sleep and daily life activities than the duration. The results of our study show that the overall picture changes when other aspects of subjective AR experience are explored. Moreover, our investigation pointed out that rhinitis duration does not affect either the perception of illness or strategies that the patient uses to deal with it. On the other hand, disease perception seems to differ when taking severity into account. Patients with moderate/severe AR tend to ascribe more symptoms and consequences to their disease as opposed to those with mild forms of AR. They have a representation of rhinitis as a pathology associated with a greater number of symptoms which, in turn, has major consequences on daily life. It is possible to hypothesize that the absence of differences in illness representation, level of distress and coping strategies between levels of severity may strongly limit an optimal disease management. This is mainly because it could lead patients to under-estimate their illness and to have non-adherent and ineffective behaviours.

The current results should be interpreted with caution because of some limitations. First, patients were recruited from specialist departments and could therefore include mainly the most severe groups of AR patients, with under-representation of the mild ARIA stage. Thus, our speculation does not apply to the general population. Second, due to the cross-sectional nature of the study, no causal inferences can be drawn. Nevertheless, our results highlight the importance of the assessment of PROs that differ from HRQoL, daily activities and sleep for a better comprehension and management of AR patients.

Acknowledgement

The study was supported by ARMIA (Associazione Ricerca Malattie Immunologiche e Allergiche). The authors thank ASPADIRES (Associazione Pazienti Disturbi Respiratori nel Sonno) and acknowledge Dr Marianna Bruzzone for linguistic assistance with the manuscript.

Authorship contribution

Conceived and designed the experiments: FB, IB, GWC.
Performed the experiments: FB, IB, NS, AM.
Analyzed the data: SM, IB, FB.
Wrote the paper: FB, IB, GWC, SM.

Conflict of interest

The authors declare no conflicts of interest.

References

1. Demoly P, Allaert FA, Lecasble M, PRAGMA. ERASM, a pharmacoepidemiologic survey on management of intermittent allergic rhinitis in every day general medical practice in France. Allergy. 2002; 57: 546-554.
2. Bauchau V, Durham SR. Prevalence and rate of diagnosis of allergic rhinitis in Europe. Eur Respir J. 2004; 24: 758–764.
3. Bachert C, van Cauwenberge P, Olbrecht J, van Schoor J. Prevalence, classification and perception of allergic and nonallergic rhinitis in Belgium. Allergy. 2006; 61: 693–698.
4. Nathan RA, Meltzer EO, Derebery J, et al. The prevalence of nasal symptoms attributed to

allergies in the United States: findings from the burden of rhinitis in an America survey. Allergy Asthma Proc. 2008; 29: 600–608.
5. Bousquet J, Khaltaev N, Cruz AA, et al. Allergic Rhinitis and its Impact on Asthma (ARIA) 2008 update. Allergy. 2008: 63: 8–160.
6. Bousquet J, Neukirch F, Bousquet PJ, et al. Severity and impairment of allergic rhinitis in patients consulting in primary care. J Allergy ClinImmunol. 2006: 117: 158–162.
7. Demoly P, Allaert FA, Lecasble M, Bousquet J; PRAGMA. Validation of the classification of ARIA (allergic rhinitis and its impact on asthma). Allergy. 2003: 58: 672–675.
8. Bousquet J, Schünemann HJ, Samolinski B, et al. Allergic Rhinitis and its Impact on Asthma (ARIA): achievements in 10 years and future needs. J Allergy Clin Immunol. 2012; 130: 1049-1062.
9. Bousquet J, Neukirch F, Bousquet PJ, et al. Severity and impairment of allergic rhinitis in patients consulting in primary care. J Allergy Clin Immunol. 2006; 117: 158-162.
10. Colás C, Galera H, Añibarro B, et al. Disease severity impairs sleep quality in allergic rhinitis (The SOMNIAAR study). Clin Exp Allergy. 2012; 42: 1080-1087.
11. Bousquet PJ, Demoly P, Devillier P, Mesbah K, Bousquet J. Impact of Allergic Rhinitis Symptoms on Quality of Life in Primary Care. Int Arch Allergy Immunol. 2012; 160: 393-400.
12. Mullol J, Valero A, Alobid I, et al. Allergic rhinitis and its impact on asthma update (ARIA 2008). The perspective from Spain. J Investig Allergol Clin Immunol. 2008; 18: 327-334.
13. Keil T, Kulig M, Simpson A, et al. European birth cohort studies on asthma and atopic diseases. I. Comparison of study designs, a GALEN initiative. Allergy. 2006; 61: 221-228.
14. Nolte H, Nepper-Christensen S, Backer V. Unawareness and undertreatment of asthma and allergic rhinitis in a general population. Respir Med 2006; 100: 354-362.
15. Baiardini I, Bousquet PJ, Brzoza Z, et al. Recommendations for assessing Patient-Reported Outcomes and Health-Related quality of life in clinical trials on allergy: a GA(2)LEN taskforce position paper. Allergy. 2010; 65: 290–295.
16. Braido F, Bousquet PJ, Brzoza Z, et al. Specific recommendations for PROs and HRQoL assessment in allergic rhinitis and/or asthma: a GA(2)LEN taskforce position paper. Allergy. 2010; 65: 959–968.
17. Moss-Morris R, Weinman J, Petrie KJ, Horne R, Cameron LD, Buick D. The Revised Illness Perception Questionnaire (IPQ-R). Psychology and Health. 2002; 17: 1-16.
18. McNair DM, Lorr M, Droppleman LF. POMS Manual: Profile of Mood States. San Diego, CA: Educational and Industrial Testing Service, 1992.
19. Boyle, GJ. A cross-validation of the factor structure of the profile of mood states: were the factors correctly identified in the first instance? Psychological Reports. 1987; 60: 343–354.
20. Norcross JC, Guadagnoli E, Prochaska JO. Factor structure of the profile of mood states (POMS): two partial replications. J Clin Psychol. 1984; 40: 1270–1277.
21. Carver CS, Scheier MF, Weintraunb JK. Assessing coping strategies: A theoretically based approach. J Personality Social Psychol. 1989; 74: 267-283.
22. Lazarus R, Folkman S. Stress, Appraisal and Coping. New York: Springer, 1984.
23. Sica C, Novara C, Dorz S, Sanavio E. Coping strategies: Evidence for cross-cultural differences? A preliminary study with the Italian version of Coping Orientation to Problem Experienced (COPE). Personality and Individual Differences 1997; 23: 1025.
24. Baiardini I, Braido F, Giardini A, et al. Adherence to treatment: assessment of an unmet need in asthma. J Investig Allergol Clin Immunol. 2006; 16: 218-223.
25. Alexandropoulos T, Haidich AB, Pilalas D, Dardavessis T, Daniilidis M, Arvanitidou M. Characteristics of patients with allergic rhinitis in an outpatient clinic: A retrospective study. Allergol Immunopathol (Madr). 2013; 41:194-200.
26. Bousquet J, Annesi-Maesano I, et al. Characteristics of intermittent and persistent allergic rhinitis: DREAMS study group. Clin Exp Allergy. 2005;35:728-732.
27. Valero A, Ferrer M, Baró E, et al. Discrimination between moderate and severe disease may be used in patients with either treated or untreated allergic rhinitis. Allergy. 2010; 65: 1609-1613.

Fulvio Braido
Allergy & Respiratory Diseases Clinic
– DIMI - University of Genoa,
IRCCS AOU San Martino-IST
Pad. Maragliano
Largo Rosanna Benzi 10. 16132
Genova
Italy

Tel/Fax: +39-(0)10-555 4893
E-mail: fulvio.braido@unige.it