

ARIA (Allergic Rhinitis and Its Impact on Asthma) Classification of Allergic Rhinitis Severity in Clinical Practice in France

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Key Words

Allergic rhinitis • Allergic Rhinitis and Its Impact on Asthma (ARIA) • Rhinitis, quality of life

Abstract

Background: The Allergic Rhinitis and Its Impact on Asthma (ARIA) workshop proposes a classification of allergic rhinitis severity. It does not take into account impairment in quality of life and treatment should be adapted accordingly. **Methods:** Two cross-sectional surveys were designed: a spring survey, for which 1,321 practitioners enrolled 3,026 patients consulting for seasonal allergic rhinitis and an autumn-winter survey, for which 1,346 practitioners enrolled 3,507 patients consulting for perennial allergic rhinitis. Simple quality of life parameters were included and logistic regressions were performed in order to assess the impairment of quality of life. **Results:** The majority of the patients were experiencing an impairment on their quality of life (92.2%). Except for cough, these patients had significantly more nasal, lung and ocular symptoms. In a multivariate analysis, rhinorrhea, nasal itching, red eyes, dyspnea, change in voice, fatigue and headache were correlated to impairment of quality of life. Persistent rhinitis was associated only with subjects who ex-

pressed difficulties in reading, and intermittent rhinitis with those who had to blow their nose and who expressed an impact on their professional activities. **Conclusions:** The proposal of the ARIA expert panel defining the severity of allergic rhinitis based on quality of life parameters is likely to simplify daily physician practice.

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Introduction

Allergic rhinitis is one of the most common human diseases. Its economical burden is substantial and guidelines have been issued to ease its management [1]. One of the most striking proposals of the so-called Allergic Rhinitis and Its Impact on Asthma (ARIA) consensus is the development of a classification in which allergic rhinitis is divided into four classes: mild or moderate to severe intermittent and mild or moderate to severe persistent. In mild rhinitis, there are no sleep alterations, no consequences on work, school activity, sport activities, daily activities or leisure and no troublesome symptoms. The usefulness of the change of the chronological classification from seasonal/perennial to intermittent/persistent

has since been validated in different European populations [2–6]. The new classification of severity based on symptom intensity and deterioration of quality of life is empirical and needs to be studied in daily practice.

It would appear logical that the intensity of symptoms and consequences on quality of life are more important than a comprehensive listing of symptoms of rhinitis in determining the level of treatment and in monitoring its efficacy. However, it is not always easy to assess the chronology of rhinitis even though its definition is relatively elementary. Symptoms, and especially those qualifying rhinitis impairment, should be linked to chronology and could then be used to develop the diagnosis.

To address these issues, we designed two pharmacoepidemiologic cross-sectional surveys on the management of allergic rhinitis in everyday medical practice in France: the ERASM study (pharmacoepidemiologic survey on the management of seasonal allergic rhinitis in everyday medical practice) [7] and the ERAP study (pharmacoepidemiologic survey on the management of perennial allergic rhinitis in everyday medical practice) [8]. These surveys involved more than 2,600 physicians and 6,500 patients suffering from allergic rhinitis.

Material and Methods

Structure and Collection of Questionnaires

The questionnaires filled out by physicians and patients were designed by a multidisciplinary group of allergists, the PRAGMA group (Programme of Research Applied to the Management of Allergic Diseases) [7]. The patient questionnaire was strictly anonymous and was distributed to the patients during the clinical consultation along with a prepaid reply envelope to return to the CENBiotech evaluation center in Dijon, France. The physician questionnaire listed the patients' sociodemographic details, case history and clinical description of their allergic rhinitis, as well as the impact of rhinitis on their daily life. The questionnaire filled out by the patients included a description of the clinical history of their allergic rhinitis (nasal symptoms, ocular symptoms, chronology, frequency and chronology of current symptoms, other symptoms).

All physicians had to fill out a questionnaire for the first 3–4 patients who consulted for what they diagnosed as seasonal allergic rhinitis during the period May 2–27, 2000 (ERASM study during the peak of the grass pollen season in France) and for what they diagnosed as perennial allergic rhinitis during the period November 15, 2000 to March 15, 2001 (ERAP study). The diagnosis of allergic rhinitis was based on clinical history (suggestive symptoms in suggestive circumstances) and although we did not ask for skin prick tests or for specific IgE measurements, 50% of the patients had already undergone these diagnostic tests and knew that they were sensitized to aeroallergens. 74% of the remaining patients underwent one of these two allergy tests.

Individual symptoms were collected. They included nasal (rhinorrhea, nasal pruritus, obstruction, sneezing and reduction of olfaction), ocular (red eyes, ocular pruritus, watering, and edema), lung (dyspnea and cough) and other symptoms such as pharyngeal irritation, change in voice, fatigue and headache.

Impact of Rhinitis on Quality of Life

In order to address the objective of this paper, the patient autoquestionnaire was used to divide the patients into two groups: mild (those recalling none of the items related to impairment of quality of life) and moderate to severe rhinitis (those recalling at least one of these parameters). The impact of rhinitis on personal and/or professional life covered the following areas: sleep, mood, intellectual concentration, quality of oral expression, reading, sport activities, eating, relation with others and the need to blow one's nose. These symptoms, which are usually part of quality of life questionnaire, allowed us to assess the quality of life felt by the patients.

Chronology of Rhinitis

Based on the patient autoquestionnaire, patients were divided into two groups: intermittent rhinitis (those suffering from rhinitis for less than 4 days a week or less than 4 consecutive weeks a year) and persistent rhinitis (those suffering for more than 4 days a week and more than 4 consecutive weeks a year) [1].

Analysis of the Data

The files thus collected were forwarded to the Medical Biostatistics Department of CENBiotech, where they were processed and analyzed with SAS software version 6.12. To address the objective of the present paper, all files containing the main criteria with no missing data were analyzed. This study used conventional parameters, means and standard deviations for quantitative variables as well as frequencies and percentages for qualitative variables. The frequency of symptoms and chronology of rhinitis were compared between the groups with and without impairment of quality of life by means of a χ^2 test. The level of significance was set with an alpha risk at 0.05.

Furthermore, two logistic regressions with the previous criteria were performed to assess the criteria associated with first impairment of quality of life and second chronology of rhinitis. In order to be included in the model, a criterion had to have a p value <0.20 in the bivariate analysis. Odds ratios are given with 95% confidence intervals. In order to increase the statistical power, criteria in three classes were grouped into two classes when it was possible. A sensitive analysis took into account the impact of such clusters.

Results

Case History of Allergic Rhinitis

The surveys were conducted by 2,667 physicians [2,010 general practitioners in both the ERASM and the ERAP studies and 204 chest physicians, 235 allergologists and 218 ENT (ear, nose and throat) doctors in only the ERAP study]. The mean age was 45.9 ± 7.3 years. 63.0% ($n =$

1,680) were practicing in an urban environment, with 15.8% (n = 421) in the Paris metropolitan region. 21.4% (n = 570) were in a semirural area and 15.6% (n = 417) in a rural area. Their distribution was homogeneous throughout France. Each physician enrolled 2.5 patients on average, instead of 3–4 as originally planned. 6,533 patients, aged 36.5 ± 13.6 years, consulted for seasonal (n = 3,026) or perennial (n = 3,507) rhinitis. Among them, 49.2% (n = 3,212) were men, 43.0% suffered from intermittent rhinitis and 57.0% from persistent rhinitis. The diagnosis was confirmed by skin tests and/or by serum allergen-specific IgE measurements in 54.8% of patients.

Impairment of Quality of Life

92.2% of the patients suffered an impairment of their quality of life, of whom 66.0% experienced sleep alterations (28.2% insomnia and 27.8% nocturnal awakening). Half of the subjects had mood problems (46.9% were irritable and 4.9% were depressed). Moreover, 85.5% had difficulty concentrating and 75.1% difficulty reading. 79.1% experienced an alteration in the quality of oral expression and 85.7% in their relationship with others. Sport activities were impaired in 88.4% of the subjects. Problems with eating were expressed by 16.0% of the subjects (loss of appetite in 13.6% and increase of appetite in 2.4%).

Except for cough, patients with quality of life impairment had significantly more nasal, lung, ocular and other symptoms (table 1). These symptoms were utilized for the multivariate analysis using a logistic regression. As the proportion of subjects with intermittent rhinitis was greater in those without impairment of quality of life (56.1 vs. 42.2%), the chronology of rhinitis was also included in the logistic model. With this model, the chronology of the rhinitis and several symptoms were associated with an impairment of quality of life. The symptoms were rhinorrhea, nasal itching, red eyes, dyspnea, change in voice, fatigue and headache. Odds ratios are summarized in table 2. Subjects with one or more of these symptoms and with a persistent rhinitis were more likely to have an impairment than the other cases.

Chronology of Rhinitis

Due to missing data, only 3,757 patients were included in this analysis: 1,432 from the seasonal allergic rhinitis ERASM study (47.3% of included patients) and 2,043 from the perennial allergic rhinitis ERAP study (66.8% of included patients).

This selected population did not differ from the whole population in terms of sleep, eating, mood, intellectual concentration, quality of oral expression, reading, sport

Table 1. Impairment of quality of life depending on symptoms

	Impairment	No impairment	p value
Subjects	5,662	479	
Nasal symptoms			
Rhinorrhea	3,850 (68.0%)	360 (75.1%)	<0.001
Obstruction	3,080 (54.4%)	319 (66.6%)	<0.001
Sneezing	3,726 (65.8%)	368 (76.9%)	<0.001
Pruritus	2,225 (39.3%)	239 (49.8%)	<0.001
Olfaction	1,127 (19.9%)	164 (34.2%)	<0.001
Eye symptoms			
Watering	1,999 (35.3%)	211 (44.0%)	<0.001
Pruritus	2,038 (36.0%)	203 (42.3%)	0.009
Red eyes	753 (13.3%)	102 (21.3%)	<0.001
Edema	187 (3.3%)	29 (6.1%)	<0.001
Lung symptoms			
Cough	1,665 (29.4%)	157 (32.7%)	NS
Wheezing	713 (12.6%)	93 (19.5%)	<0.001
Other symptoms			
Pharyngeal irritation	2,695 (47.6%)	260 (54.2%)	0.02
Change in voice	1,699 (30.0%)	211 (44.0%)	<0.001
Fatigue	1,155 (20.4%)	185 (38.7%)	<0.001
Headache	832 (14.7%)	148 (30.9%)	<0.001

Analysis limited to 6,141 subjects. NS = Nonsignificant.

Table 2. Impact of chronology and symptoms on the impairment of quality of life

	Odds ratio	95% confidence interval	p value
Intermittent rhinitis	0.58	0.46–0.73	<0.001
Rhinorrhea	1.31	1.01–1.70	0.03
Nasal itching	1.28	1.01–1.62	0.05
Red eyes	1.52	1.07–2.15	0.005
Dyspnea	1.63	1.12–2.37	0.009
Change in voice	1.43	1.06–1.93	0.02
Fatigue	1.72	1.21–2.46	<0.001
Headache	1.74	1.16–2.60	0.001

activities, relationships with others and the need to blow their nose (table 3). Their mean age was 35.9 ± 13.2 years and 52.2% were female. 58.8% had persistent rhinitis and 41.2% intermittent rhinitis. However, although not clinically significant and because of the large numbers, the proportion of patients experiencing fatigue and an impact on their professional activity or personal appearance was more important in the selected population as compared to those of the whole population ($p < 0.001$).

Table 3. Comparison between total population and restricted population in order to assess chronology of rhinitis depending on quality of life symptoms

	Restricted population to assess chronology	Population	p value
Sex			0.04
Male	1,655 (47.8%)	3,212 (49.2%)	
Age	35.9 ± 13.2	36.5 ± 13.6	NS
Rhinitis			NS
Persistent	2,053 (58.8%)	3,724 (57.0%)	
Intermittent	1,432 (41.2%)	2,809 (43.0%)	
Sleep			NS
No problems	1,509 (43.4%)	2,214 (44.1%)	
Difficulty falling asleep	1,003 (28.9%)	1,411 (28.1%)	
Nocturnal awakening	963 (17.8%)	1,394 (17.8%)	
Eating			NS
No problems	2,937 (84.5%)	4,228 (84.2%)	
Decrease	459 (13.2%)	676 (13.5%)	
Increase	79 (2.3%)	115 (2.3%)	
Mood			NS
No problems	1,632 (47.0%)	2,418 (48.2%)	
Irritable	1,689 (48.6%)	2,356 (46.9%)	
Depressed	154 (4.4%)	245 (4.9%)	
Intellectual concentration			NS
No problems	516 (14.8%)	726 (14.5%)	
Minor impact	2,545 (73.2%)	3,682 (73.4%)	
Major impact	414 (11.9%)	611 (12.2%)	
Quality of oral expression			NS
No problems	733 (21.1%)	1,041 (20.7%)	
Minor impact	2,545 (73.2%)	3,676 (73.2%)	
Major impact	197 (5.7%)	302 (6.0%)	
Reading			NS
No problems	890 (25.6%)	1,249 (24.9%)	
Minor impact	2,437 (70.1%)	3,538 (70.5%)	
Major impact	148 (4.3%)	232 (4.6%)	
Sport activities			NS
No problems	420 (12.1%)	587 (11.7%)	
Minor impact	2,357 (67.8%)	3,486 (69.5%)	
Major impact	698 (20.1%)	946 (18.8%)	
Relationship with others			NS
No problems	486 (14.0%)	718 (14.3%)	
Minor impact	2,468 (71.0%)	3,583 (71.4%)	
Major impact	521 (15.0%)	718 (14.3%)	
Need to blow one's nose			NS
No need	166 (4.8%)	252 (5.0%)	
Minor	1,664 (47.9%)	2,498 (49.8%)	
Major	1,645 (47.3%)	2,269 (45.2%)	
Fatigue			<0.01
No	1,871 (53.8%)	3,479 (58.8%)	
Yes	1,604 (46.2%)	2,435 (41.2%)	
Impact on professional activity			<0.01
No	1,002 (28.8%)	1,802 (34.9%)	
Yes	2,473 (71.2%)	3,365 (65.1%)	
Impact on physical appearance			<0.01
No	1,752 (50.4%)	2,780 (53.6%)	
Yes	1,723 (49.6%)	2,407 (46.4%)	

With the exception of age (years; mean and standard error) values represent number. Comparison: χ^2 test. NS = Nonsignificant.

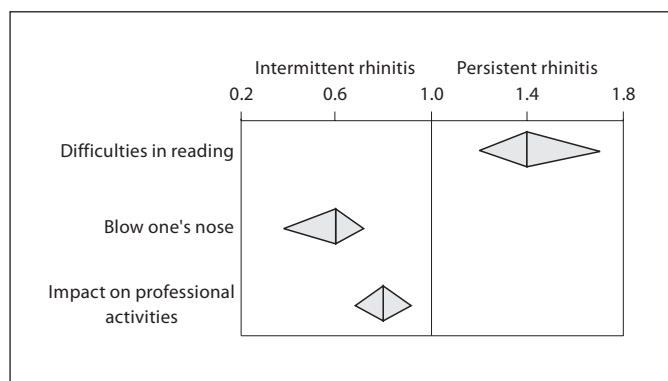


Fig. 1. Chronology of rhinitis. Odds ratio and 95% confidence interval.

Within this selected population, patients with intermittent rhinitis and those with persistent rhinitis did not differ in terms of sleep, eating, mood, sport activities, relationships with others, fatigue and physical appearance but were significantly different in terms of intellectual concentration ($p = 0.013$), quality of oral expression ($p < 0.001$), reading ($p < 0.001$), need to blow their nose ($p = 0.015$) and impact on professional activity ($p = 0.012$) (table 4). The grouping of variables into two classes to allow further analysis did not change the results.

In order to appreciate and stratify any independent factors linked to the chronology of rhinitis, a multivariate analysis was carried out using a logistic regression model with a stepwise selection. The following symptoms were included in the model: intellectual concentration, quality of oral expression, reading, need to blow one's nose and professional activity. Three factors were associated with the chronology: need to blow one's nose ($p < 0.001$), reading ($p < 0.001$) and impact on professional activity ($p = 0.002$) (fig. 1). Subjects who expressed difficulties in reading had more frequently persistent rhinitis [odds ratio for persistent rhinitis: 1.4 (1.2–1.7)]. Conversely, subjects that had to blow their nose and who expressed an impact of their rhinitis on their professional activities had more frequently intermittent rhinitis [odds ratio for persistent rhinitis, respectively, 0.6 (0.4–0.7) and 0.8 (0.7–0.9)]. Finally, a sensitive analysis detected the same results.

Discussion

Both the ERAP and the ERASM studies allowed us to include 6,533 patients from all the regions of France consulting a general practitioner or a specialist for allergic

rhinitis. The majority of the patients had an impairment of their quality of life (92.2%). Except for cough, these patients had significantly more nasal, lung and ocular symptoms. In the multivariate analysis, rhinorrhea, nasal itching, red eyes, dyspnea, change in voice, fatigue and headache were correlated with impairments of quality of life. Moreover, by comparison with patients with intermittent rhinitis, those with persistent rhinitis had more frequently problems with intellectual concentration, quality of oral expression, reading, the need to blow their nose and impact on professional activity. In the multivariate analysis, persistent rhinitis was associated only with subjects who expressed difficulties in reading, and intermittent rhinitis with those who had to blow their nose and who expressed an impact on their professional activities.

In this study, no specific validated questionnaire of quality of life was used as for instance the RQLQ (Rhinoconjunctivitis Quality of Life Questionnaire) [9]. However, similar questions as the one used in these questionnaires were asked (i.e. impairment of nose symptoms, impact on sleeping). It is therefore possible to assess the quality of life of patients. Moreover, it is now well established that quality of life deteriorates with rhinitis [1, 4, 7, 9] and that patients who consult for allergic rhinitis are usually those who express symptoms and experience an impairment of their quality of life. This can easily explain the high proportion (92.2%) of patients with a deterioration of their quality of life. In a study conducted by van Cauwenberge et al. [10], 89% of 431 patients considered the severity of their symptoms on a visual analog scale as moderate to severe. These scale scores were perfectly correlated with specific quality of life scores. Bousquet et al. [11] found similar results in a study on 3,052 patients seen in primary care and suffering from allergic rhinitis for at least 3 years. In our study, we found that the impairment of quality of life was correlated to symptoms such as rhinorrhea, nasal itching, red eyes, dyspnea, change in voice, fatigue and headache. These findings confirmed the classification proposed by WHO [1] in 2001. Experts have proposed a classification of severity of rhinitis based on the deterioration of quality of life and symptom intensity (mild vs. moderate to severe). Thus, the intensity and consequences of symptoms on quality of life are more important than a comprehensive listing of symptoms of rhinitis and the former should determine the level of treatment.

Chronology of rhinitis was also studied. The number of excluded subjects was important. These exclusions were due to missing data in at least one of the questions

Table 4. Comparison between persistent and intermittent rhinitis

	Persistent	Intermittent	p value
Sleep			0.23
No problems	882 (43.2%)	627 (43.8%)	
Difficulty falling asleep	574 (28.1%)	429 (30.0%)	
Nocturnal awakening	587 (28.7%)	376 (26.2%)	
Eating			0.37
No problems	1,716 (84.0%)	1,221 (85.3%)	
Decrease	275 (13.5%)	184 (12.8%)	
Increase	52 (2.5%)	27 (1.9%)	
Mood			0.64
No problems	973 (47.6%)	659 (46.0%)	
Irritable	980 (48.0%)	709 (49.5%)	
Depressed	90 (4.4%)	64 (4.5%)	
Intellectual concentration			0.013
No problems	1,461 (71.5%)	1,084 (75.7%)	
Minor impact	251 (12.3%)	163 (11.4%)	
Major impact	331 (16.2%)	185 (12.9%)	
Quality of oral expression			<0.001
No problems	1,450 (71.0%)	1,095 (76.5%)	
Minor impact	119 (5.8%)	78 (5.4%)	
Major impact	474 (23.2%)	259 (18.1%)	
Reading			<0.001
No problems	1,374 (67.2%)	1,063 (74.2%)	
Minor impact	89 (4.4%)	59 (4.1%)	
Major impact	580 (28.4%)	310 (21.7%)	
Sport activities			0.23
No problems	1,365 (66.8%)	992 (69.3%)	
Minor impact	417 (20.4%)	281 (19.6%)	
Major impact	261 (12.8%)	159 (11.1%)	
Relationship			0.12
No problems	1,424 (69.7%)	1,044 (72.9%)	
Minor impact	322 (15.8%)	199 (13.9%)	
Major impact	297 (14.5%)	189 (13.2%)	
Need to blow one's nose			0.015
No need	938 (45.9%)	726 (50.7%)	
Minor	1,009 (49.4%)	636 (44.4%)	
Major	96 (4.7%)	70 (4.9%)	
Fatigue			0.58
No	1,108 (54.2%)	763 (53.3%)	
Yes	935 (45.8%)	669 (46.7%)	
Impact on professional activity			0.012
No	556 (27.2%)	446 (31.1%)	
Yes	1,487 (72.8%)	986 (68.9%)	
Impact on physical appearance			0.95
No	1,031 (50.5%)	721 (50.4%)	
Yes	1,012 (49.5%)	711 (49.6%)	
Values represent number. Comparison: χ^2 test.			

included in the analysis. However, no differences could be found for the main parameters between this selected population and the original population. The only effect of such a selection is to reduce the power of the study. Three criteria are linked to the chronology of allergic rhi-

nititis. One, 'difficulty in reading', is linked to persistent rhinitis, meaning that patients with persistent rhinitis have more difficulties in reading. On the other hand, two criteria, 'need to blow one's nose' and 'difficulties in professional activity', are linked to intermittent rhinitis.

The intensity of symptoms and the consequences on quality of life seem to be more important than a comprehensive listing of symptoms of rhinitis. It is now well-known that intensity and chronology can both be evaluated by symptoms. However, it seems to be more efficient for both practitioner and patient to talk about the impact of the disease rather than to simply list symptoms using medical words which are usually incomprehensible for the patient. The proposal of the ARIA expert panel defining the severity of allergic rhinitis based on quality of life parameters is likely to simplify daily physician practice.

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