

Original article

A survey of the burden of allergic rhinitis in Europe

Background: The perceptions of patients and physicians regarding the symptoms and impact of allergic rhinitis (AR) were assessed in a prospective, cross-sectional, international survey. This paper presents the combined survey results from five European countries (Germany, France, Italy, Spain and the UK).

Methods: Data were recorded by 1482 patients and matched with records from 415 primary care physicians and specialists. Diagnostic tests to confirm AR had been performed on 1279 (86.3%) patients. Both physicians and patients recorded the presence, severity and impact of symptoms at the time of consultation in addition to those symptoms frequently, but not currently, present. Health-related quality of life (HRQoL) was assessed using the Mini Rhinoconjunctivitis Quality of Life Questionnaire.

Results: A large proportion of patients had moderate–severe disease (67.2%; $n = 996$), persistent disease (42.5%; $n = 630$) and comorbidities such as asthma (31.5%; $n = 467$). Overall, patients rated their disease as more severe than did physicians ($P < 0.001$). At the time of the consultation, one-third of all patients reported that their current nasal and ocular symptoms were moderate or severe in nature. According to the physicians' assessment, good control of nasal and ocular symptoms was achieved in 45.4% ($n = 673$) and 51.3% ($n = 760$) of patients, respectively, and poor symptom control in 18.0% ($n = 267$) and 12.1% ($n = 179$). Overall, 43.3% ($n = 641$) of those surveyed were using two or more medicines for their AR. Health-related quality of life was correlated with disease severity and with the number of days without symptoms in the previous 4 weeks. Allergic rhinitis had a significantly greater impact in patients with more persistent disease than in those with intermittent disease (2.3 ± 1.3 vs 1.9 ± 1.2 ; $P < 0.001$). Nonetheless, 81.8% ($n = 601$) of patients with intermittent disease reported some impairment of their daily life as a result of their AR.

Conclusions: Allergic rhinitis remains a significant health problem because of the high burden of symptoms and its impact on general well being and HRQoL among patients consulting for this condition. Overall, there was a poor correlation between patients and physicians in the reporting of disease severity.

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Key words: allergic rhinitis; burden; Europe; health-related quality of life; survey; symptom control.

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Allergic rhinitis (AR) is a common inflammatory condition affecting the upper airways, nose and eyes. In a pan-European survey of an unselected population, the prevalence of self-reported AR was 18.7% across Europe, with lowest prevalence reported for Spain (15.1%) and Italy (16.1%), and the highest prevalence in Germany (20.5%) and the UK (21.8%); France had an intermediate prevalence rate (18.2%) (1).

To the nonsufferer, AR may seem inconsequential. However, studies have shown that the bothersome nature of AR symptoms (rhinorrhoea, nasal congestion and sneezing) impairs the usual performance of daily

activities, quality of sleep, cognitive function, work productivity, examination performance (2) and also has an impact on psychosocial well being (3, 4). Because of its increasing prevalence (5) and impact on quality of life (QoL), AR is associated with a heavy cost in medical care for both individuals and the society as a whole (6).

Fewer than half (45%) of AR patients seek medical advice or treatment for their condition; in contrast, most individuals with AR self-medicate using over-the-counter antihistamine therapy (1, 7). Those who are diagnosed with AR are likely to have more persistent disease, a higher symptom severity score and more visible

symptoms (i.e. seasonal symptoms, symptoms that could be linked to specific triggers and concurrent asthma) than those who have never been diagnosed by their physician (1). In this self-selected group of patients who regularly consult their physician, AR has been shown to have a negative impact on general health, comorbid illness and QoL (8, 9). An estimated 30% of patients with AR have co-existing asthma (10) and >60% of patients with asthma also have AR (11, 12).

The importance of AR in the clinical practice of primary care physicians and specialists prompted this prospective, cross-sectional, international survey, which was conducted among patients and physicians to identify perceptions of the symptoms and impact of disease in AR. This paper presents the combined survey results from five European countries (Germany, France, Italy, Spain and the UK).

Methods

Study design

The Allergy Disease Specific Programme (DSP[®]), run by Adelphi Group Products (Bollington, UK), was conducted between February and April 2006, and recruited specialists and primary care physicians, and their patients. The full methodology for this survey has been outlined previously (13).¹ Physicians completed a patient record form (PRF) for consecutive patients, and patients were invited to fill out a patient self-completed (PSC) form. All patients over the age of 12 years with a clinical diagnosis of AR, as characterized by the physician, were eligible for inclusion in the survey, irrespective of whether or not they were consulting for AR on the day of the survey. Physicians recorded data relating to patient characteristics, diagnosis, symptoms and their severity, common triggers, comorbidities, current and past drug treatments and healthcare resource utilization. Patients recorded information on disease history, symptoms and their severity, the impact of AR on normal activities (including sleep, sport and leisure, work or school) and treatment satisfaction.

Symptom and HRQoL assessments

Because of the intermittent nature of the disease, physicians and patients recorded both the presence and severity of symptoms at the time of consultation as well as those frequently, but not currently, present. Health-related quality of life was assessed using the Mini Rhinoconjunctivitis Quality of Life Questionnaire (miniRQLQ), which is a validated, disease-specific QoL questionnaire developed to measure the functional problems in adults with rhinoconjunctivitis (14). Using a 7-point scale where '6' represents the greatest impairment and '0' represents the least, patients assessed the impact of rhinoconjunctivitis across five domains: activity (daily activities, work/school performance and sleep), practical problems (need to rub eyes and blow nose repeatedly), nasal symptoms, ocular symptoms and other symptoms.

¹Further information on patient self-completed (PSC) forms and physician-completed patient record forms (PRF) are available from Mark Small, mark.small@adelphigroup.com, on request.

Statistical methods

All statistical analyses were conducted using the Statistical Package for the Social Sciences Version 14 (SPSS Inc., Chicago, IL, USA) and STATA Version 9.2 (StataCorp LP, College Station, TX, USA). ANOVA and Pearson's chi-squared tests were first applied to mean and proportion data, respectively, across the three patient sub-groups [perennial AR (PAR), seasonal AR (SAR) and mixed (SAR + PAR) as characterized by the physician]. Only if these tests were significant ($P < 0.05$) were further statistical tests conducted on pair-wise sub-group comparisons. In these comparisons, *t*-tests were used to compare means and Fisher's exact tests or chi-squared tests were used to compare proportions. Bonferroni adjustments were applied to these tests to take account of multiple testing.

Only data from matched pairs of PRFs and PSCs were included in this analysis. Kappa statistics were used to assess the level of agreement between patients and physicians (15), and either Wilcoxon or McNemar tests were used to assess whether there was a tendency for one group to have a more severe outlook than the other, dependent on whether the underlying outcome measure was respectively ordinal or binary in nature.

Results

Patient characteristics

Data were recorded for 1482 patients. Primary care physicians recruited most patients (61.4%; $n = 910$) and specialists recruited the remainder. One-quarter (26.5%; $n = 393$) of patients had consulted for routine follow-up, 41.2% ($n = 610$) had consulted for repeat prescriptions and 13.3% ($n = 197$) for worsening symptoms.

Diagnostic tests had been performed on 86.3% ($n = 1279$) of patients to confirm AR either during the visit or at a prior visit. Most patients had received skin prick/puncture tests or measurement of specific IgE (radioallergosorbent) [70.1% ($n = 1039$) and 38.1% ($n = 564$), respectively], and a further 14.6% of patients ($n = 216$) had received a nasal allergen test. A nasal endoscopy or rhinoscopy had been performed in a few patients (12.6%; $n = 187$).

The patient characteristics, as assessed by the physician, are summarized in Table 1. More than two-thirds (69.6%; $n = 1032$) of those included in the study were diagnosed with SAR, 26.5% ($n = 392$) with PAR and 3.9% ($n = 58$) with SAR + PAR.

Overall, 42.5% ($n = 625$) of the patients surveyed had persistent symptoms (defined as symptoms > 4 days/week and > 4 consecutive weeks). Persistent symptoms were recorded among a significantly greater number of patients with SAR + PAR than patients with SAR [$n = 33$ (56.9%) vs $n = 416$ (40.3%); $P < 0.05$]. There was no significant difference in the percentages of patients with persistent symptoms in the PAR (46.3%; $n = 181$) and SAR (40.3%; $n = 416$) groups (Table 1).

Most patients were using a non-sedating antihistamine (NSA) (42.8%; $n = 634$), an intranasal corticosteroid (INS) (14.8%; $n = 219$), or a combination of these two treatments (31.4%; $n = 465$). Overall, 43.3% ($n = 641$)

Table 1. Patient characteristics according to type of allergic rhinitis (physicians' assessment) (Germany, France, Italy, Spain and the UK)

	SAR + PAR (<i>n</i> = 58)	PAR (<i>n</i> = 392)	SAR (<i>n</i> = 1032)	Total (<i>n</i> = 1482)
Type of allergic rhinitis (% of total)	3.9	26.5	69.6	100.0
Age (years)				
Mean ± SD	32.34 ± 13.5	36.23 ± 14.3	35.83 ± 14.1	35.80 ± 14.1
Age groups, <i>n</i> (%)				
<18 years	7 (12.1)	33 (8.4)	63 (6.1)	103 (7.0)
18–24 years	14 (24.1)	56 (14.3)	201 (19.5)	271 (18.3) ^d
25–64 years	36 (62.1)	288 (73.5)	722 (70.0)	1046 (70.6)
≥65 years	1 (1.7)	15 (3.8)	46 (4.5)	62 (4.2)
Sex, <i>n</i> (%)				
Female	36 (62.1)	237 (60.5) ^c	542 (52.7)	815 (55.1) ^d
Male	22 (37.9)	155 (39.5) ^c	486 (47.3)	663 (44.9) ^d
Duration since diagnosis (years)				
Mean ± SD	9.28 ± 8.01 ^a	6.32 ± 7.27	7.21 ± 7.45	7.06 ± 7.44 ^d
Frequency of symptoms, <i>n</i> (%)				
Intermittent*	25 (43.1)	211 (53.7)	616 (59.7)	852 (57.5)
Persistent†	33 (56.9) ^b	181 (46.3)	416 (40.3)	630 (42.5)
Disease severity, <i>n</i> (%)				
Mild	12 (21.4)	102 (26.1)	370 (35.9)	486 (32.8)
Moderate/severe	46 (78.6)	290 (73.9)	662 (64.1)	996 (67.2)
Smoking status, <i>n</i> (%)				
Never smoked	33 (58.9)	263 (68.3)	691 (68.1)	987 (67.8)
Ex-smoker	10 (17.9)	65 (16.9)	155 (15.3)	230 (15.8)
Current smoker	13 (23.2)	57 (14.8)	169 (16.7)	239 (16.4)
Common comorbidities (>5%), <i>n</i> (%)				
Asthma	27 (46.6) ^b	141 (36.0) ^c	299 (29.0)	467 (31.5)
Sinusitis	3 (5.2)	30 (7.7)	58 (5.6)	91 (6.1)
Anxiety	6 (10.3)	53 (13.5)	113 (10.9)	172 (11.6)
Depression	7 (12.1) ^b	24 (6.1)	39 (3.8)	70 (4.7)
Consulting physician, <i>n</i> (%)				
Primary care	24 (41.4) ^b	226 (57.7)	660 (64.0)	910 (61.4) ^d
Specialist	34 (58.6) ^b	166 (42.3)	372 (36.0)	572 (38.6) ^d

PAR, perennial allergic rhinitis; SAR, seasonal allergic rhinitis; SD, standard deviation.

* Intermittent: symptoms <4 days/week or <4 consecutive weeks.

† Persistent: symptoms >4 days/week or >4 consecutive weeks.

^a*P* < 0.05 SAR + PAR vs PAR; ^b*P* < 0.05 SAR + PAR vs SAR; ^c*P* < 0.05 PAR vs SAR; ^d*P* < 0.05 SAR + PAR vs PAR vs SAR.

of those surveyed were using two or more medicines for their AR. Patients with severe disease were more likely to be prescribed combination therapy (*P* < 0.001) than were those with moderate or mild disease. Eighty per cent (*n* = 373) of patients currently prescribed an NSA + INS had moderate or severe disease.

Physicians reported that 67.2% (*n* = 996) of patients had moderate or severe disease compared with a patient-reported incidence of 73.1% (*n* = 1083). There was a higher incidence of moderate or severe disease in patients with SAR + PAR (78.6%; *n* = 46) and PAR (73.9%; *n* = 290) compared with SAR (64.1%; *n* = 662); however, only the difference between PAR and SAR was statistically significant (*P* < 0.05).

Comparison of the physicians' and patients' assessment of disease severity indicated that patients rated their disease as more severe than physicians across all three types of AR (*P* < 0.001). The patient-reported incidence of severe disease was higher than that reported by physicians for all types of AR: SAR + PAR [23.6%

(*n* = 14) vs 8.9% (*n* = 5)], PAR [15.3% (*n* = 60) vs 10.5% (*n* = 41)] and SAR [13.1% (*n* = 135) vs 6.6% (*n* = 68)]; all these differences were statistically significant (*P* < 0.05) (Fig. 1). Only a moderate level of agreement between physicians and patients was found in the assessment of disease severity for patients with SAR and PAR, with the least agreement between physicians and patients for those with SAR + PAR.

Common comorbidities among patients with AR were asthma, sinusitis, anxiety and depression (Table 1). A current or past diagnosis of asthma was less common among patients with SAR (29.0%) than among patients with either PAR (36.0%; *P* < 0.05) or SAR + PAR (46.6%; *P* < 0.05). Depression was more common among patients with SAR + PAR (12.1%) than among patients with SAR (3.8%; *P* < 0.05). There were no statistical differences between the groups for other comorbidities. Analysis of patients according to symptom frequency found that patients with persistent AR were significantly more likely to present with comorbid asthma

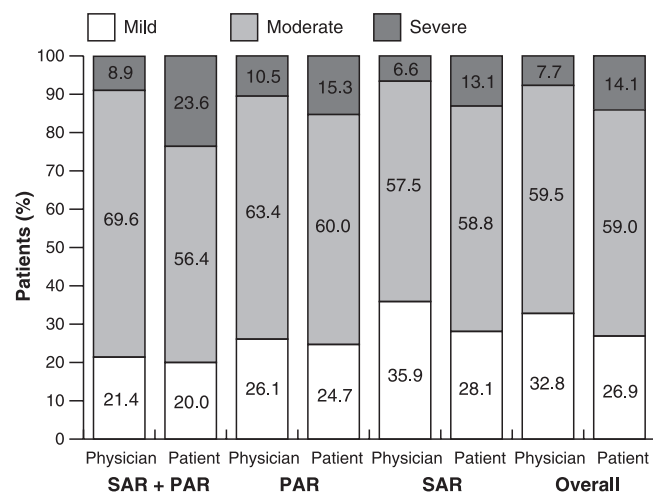


Figure 1. Disease severity reported by physicians and patients (Germany, France, Italy, Spain and the UK).

than patients with intermittent AR [36.6% ($n = 227$) vs 28.2% ($n = 238$); $P < 0.001$]; with no significant difference between the groups for other comorbidities.

Symptomatology

The types of symptoms reported by patients were similar across all types of AR (Fig. 2). The most common patient-reported symptoms currently or frequently present in $> 50\%$ of patients with AR were: nasal congestion, rhinorrhoea, sneezing, watery eyes, itchy/red eyes and itchy nose. Compared with patients with SAR + PAR, patients with SAR and PAR reported fewer current symptoms or frequently present symptoms ($P < 0.001$; Fig. 2).

Congestive symptoms (sinus pressure and blocked nose), as well as cough, wheeze and nocturnal waking, were more commonly reported by patients who were diagnosed with SAR + PAR than those diagnosed with either PAR or SAR ($P < 0.05$; Fig. 2). By contrast, ocular (itchy/red eyes and watery eyes) and irritating symptoms (nasal itch and sneezing) were more commonly present among patients with SAR (and patients with SAR + PAR) than in those with PAR ($P < 0.05$; Fig. 2).

Evaluation of the symptom profile of patients with intermittent and persistent symptoms indicated little difference in the spectrum of symptoms reported by each patient group. All symptoms (with the exception of sinus pressure, itchy palate and itchy nose) were significantly more prevalent among patients with persistent than intermittent disease ($P < 0.05$; Table 2).

Most patients (97.7%; $n = 1448$) reported suffering from at least one symptom; 96.7% ($n = 1433$) reported suffering two or more symptoms. Over 70% of patients (71.4%; $n = 1058$) with AR reported suffering from nasal and ocular symptoms either currently or frequently, and 32.8% ($n = 486$) of all patients reported that their

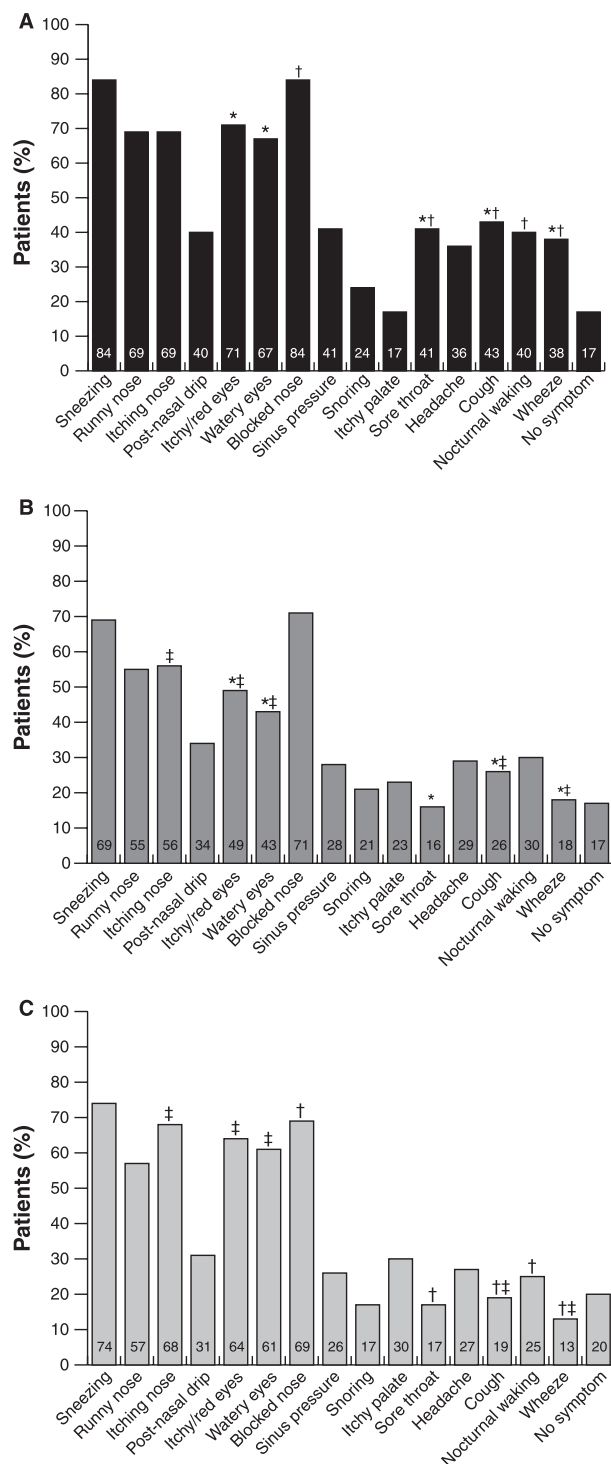


Figure 2. Patient-reported symptoms: currently or frequently present (Germany, France, Italy, Spain and the UK) for patients with seasonal allergic rhinitis + perennial allergic rhinitis (SAR + PAR) (2A), PAR (2B) and SAR (2C). Patients recorded symptoms as frequently present only if not currently present. * $P < 0.05$ SAR + PAR vs SAR; † $P < 0.05$ SAR + PAR vs SAR; ‡ $P < 0.05$ PAR vs SAR.

Table 2. Patient-reported incidence of symptoms (currently or frequently present) among patients with intermittent and persistent disease (Germany, France, Italy, Spain and the UK)

Symptom	Intermittent (n = 852) (%)	Persistent (n = 630) (%)	Total (n = 1482) (%)	P-value
Sneezing	69.0	79.0	73.0	<0.01
Runny nose	53.0	62.0	57.0	<0.01
Itching nose	63.0	67.0	65.0	ns
Postnasal drip	30.0	35.0	32.0	<0.05
Itchy/red eyes	57.0	63.0	60.0	<0.05
Watery eyes	53.0	60.0	56.0	<0.01
Blocked nose	68.0	73.0	70.0	<0.05
Sinus pressure	26.0	29.0	28.0	ns
Snoring	15.0	21.0	18.0	<0.01
Itchy palate	26.0	30.0	28.0	ns
Sore throat	16.0	20.0	17.0	<0.05
Headache	24.0	33.0	28.0	<0.01
Cough	19.0	25.0	21.0	<0.01
Nocturnal waking	21.0	34.0	27.0	<0.01
Wheeze	11.0	21.0	15.0	<0.01
No symptom	20.0	17.0	19.0	ns

ns, not significant.

current nasal and ocular symptoms were moderate or severe in nature.

Across all patient groups, the mean number of days in which patients reported no symptoms was 13.8 over 4 weeks (13.3 for patients with PAR, 14.0 for patients with SAR and 12.0 for patients with SAR + PAR). Symptom-free days were more common for patients with mild disease (mean 16.2 ± 9.0) than for those with moderate or severe disease (mean 12.6 ± 8.9 ; $P < 0.001$). Approximately one in 10 patients (9.2%; $n = 136$) reported being symptom-free in the past 4 weeks, with no significant differences between the groups according to the type of AR: 7.8% ($n = 30$) of patients with PAR were symptom-free, compared with 9.8% ($n = 101$) of patients with SAR and 8.9% ($n = 5$) of patients with SAR + PAR.

According to physicians' assessment, nasal symptoms were 'well' or 'completely' controlled over a 4-week period in 45.4% ($n = 673$) of patients. Physicians considered that only 18.0% ($n = 267$) of patients had 'poorly' controlled nasal symptoms, relating to their AR. Similarly, rhinitis and ocular symptoms were 'well' or 'completely' controlled in 51.3% ($n = 760$) and 46.9% ($n = 695$) of patients but 'poorly' controlled in 13.0% ($n = 193$) and 12.1% ($n = 179$) of patients, respectively. Patients with SAR + PAR were less likely to have 'well' or 'completely' controlled nasal symptoms than patients with SAR or PAR [35.1% ($n = 20$) vs 47.5% ($n = 490$) vs 41.1% ($n = 161$)], although these differences were not statistically significant.

Overall, 40.8% ($n = 604$) of patients across all groups [and 58.6% ($n = 34$) of patients with SAR + PAR] indicated that their AR symptoms were bothersome

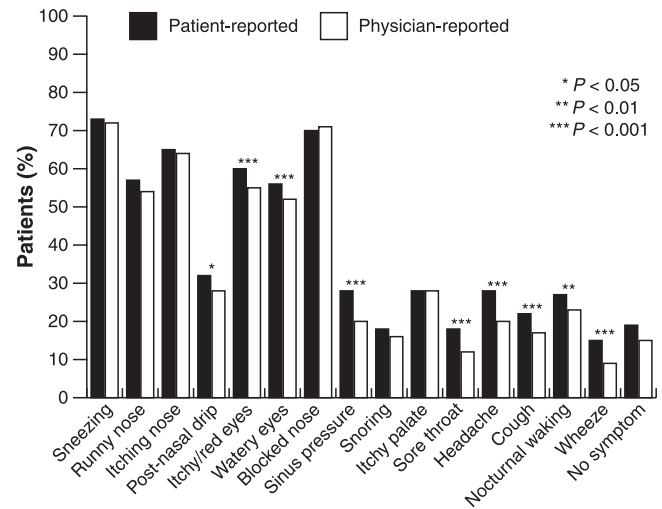


Figure 3. Total incidence of patient- and physician-reported symptoms (Germany, France, Italy, Spain and the UK).

immediately after waking. The majority of patients (82.7%; $n = 1225$) also reported bothersome symptoms at other times of day, whereas 23.5% ($n = 348$) of patients were concerned by symptoms at night.

According to the patients' assessment of symptoms, nasal and ocular symptoms were frequently the most troublesome. Half (49.8%; $n = 738$) of patients reported a nasal symptom to be the most troublesome and 19.7% ($n = 292$) of patients reported either itchy/red eyes or watery eyes as the most troublesome symptom. Furthermore, 21.2% ($n = 188$) of the 59.9% ($n = 888$) of patients who suffered from itchy/red eyes considered that this symptom was the most troublesome.

Compared with the patient-reported incidence of currently or frequently present symptoms, physicians tended to underestimate ($P < 0.05$) the incidence of ocular symptoms, headache, sore throat, sinus pressure, postnasal drip, coughing, wheezing and nocturnal waking, but more accurately reflected the patient-reported incidence of nasal congestion, itchy nose and palate, runny nose, sneezing and snoring (Fig. 3).

Overall, physicians consistently reported a lower incidence of severe symptoms than did patients during the current visit (data not shown). Commonly presenting severe symptoms (reported by more than one in 10 patients during the current visit) were: itchy/red eyes, watery eyes, postnasal drip, runny nose, sneezing, blocked nose, headache, sinus pressure, nocturnal waking and snoring.

Comorbidity of asthma

According to the physicians' assessment, more patients with asthma than without asthma had moderate or severe disease [73.7% ($n = 341$) vs 64.3% ($n = 652$); $P < 0.001$]. Some symptoms, such as nocturnal waking

[26.6% ($n = 124$) vs 21.2% ($n = 215$); $P < 0.05$], wheezing [19.9% ($n = 93$) vs 3.3% ($n = 34$); $P < 0.001$], sore throat [14.6% ($n = 68$) vs 10.1% ($n = 103$); $P < 0.05$] and coughing [30.4% ($n = 142$) vs 11.2% ($n = 114$); $P < 0.001$], were more currently or frequently present in patients with asthma than in those without asthma according to the physicians' assessment. No other differences in the reporting of symptoms were statistically significant. Physicians considered that overall symptom control was similar in patients with and without asthma: 50.7% ($n = 221$) of patients with asthma and 51.6% ($n = 481$) of patients without asthma had 'well' or 'completely' controlled symptoms.

Consistent with the physicians' findings, significantly more patients with than without asthma reported that they had moderate or severe AR [81.9%; ($n = 370$) vs 69.1%; ($n = 678$); $P < 0.001$]. Some symptoms, including nocturnal waking [31.7% ($n = 148$) vs 24.2% ($n = 246$); $P < 0.01$], wheezing [33.4% ($n = 156$) vs 6.7% ($n = 68$); $P < 0.001$], sore throat [21.6% ($n = 101$) vs 15.7% ($n = 159$); $P < 0.01$], sneezing [76.4% ($n = 357$) vs 71.3% ($n = 724$); $P < 0.05$] and coughing [34.5% ($n = 161$) vs 15.8% ($n = 160$); $P < 0.001$], were more currently or frequently present in patients with asthma than in those without asthma according to the patients' assessment. No other differences were significant.

Impact on sleep and daily activities

Overall, >50% of patients reported that their symptoms of AR had some impact on their sleep patterns over the previous month: 56.0% ($n = 793$) and 56.5% ($n = 800$) of patients, respectively, reported that they had trouble falling asleep or awoke during the night.

Patients with both persistent disease and intermittent disease reported that during the previous month, on some occasions, they had trouble falling asleep [61.0% ($n = 372$) and 52.3% ($n = 421$); $P < 0.001$], awoke during the night [62.7% ($n = 383$) and 51.8% ($n = 417$); $P < 0.001$] or had trouble staying asleep [60.4% ($n = 369$) and 50.8% ($n = 410$); $P < 0.001$] because of AR symptoms. As a consequence, 70.7% ($n = 429$) of patients with persistent disease and 60.3% ($n = 484$) of patients with intermittent disease reported that they had not had sufficient sleep because of their AR on some occasions in the past month ($P < 0.001$).

Most patients considered that their AR symptoms had a significant impact on daily activities (82.8%; $n = 1227$) and on work/school performance (79.0%; $n = 1170$) in the past 7 days. Allergic rhinitis had a moderate or severe impact on daily activities and school/work performance in 13.5% ($n = 200$) and 12.9% ($n = 191$) of patients, respectively. An evaluation of impact according to the types of AR (SAR + PAR vs PAR or SAR) showed no statistically significant differences among the groups.

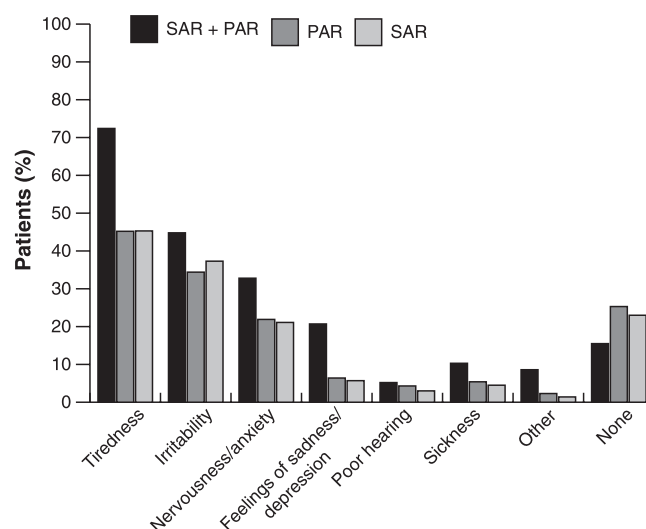


Figure 4. The impact of allergic rhinitis on how patients felt (Germany, France, Italy, Spain and the UK).

For most patients with persistent and intermittent disease, AR had an impact on daily activities [84.2% ($n = 463$) and 81.8% ($n = 601$), respectively] and work/school performance [78.9% ($n = 285$) and 78.5% ($n = 347$)] in the past 7 days. The symptoms of AR also appeared to affect patients' mood: 46.3% of patients reported feeling tired, 36.8% reported feeling irritable and 4.9% reported a general malaise (Fig. 4). One in four patients (23.3%; $n = 345$) reported that their AR had no impact on how they felt. Approximately 50% of patients with persistent and intermittent disease reported feeling tired [51.0% ($n = 319$) and 42.7% ($n = 360$); $P = 0.001$] and one-third felt irritable because of their AR [37.9% ($n = 237$) and 35.9% ($n = 303$); ns].

Health-related quality of life (miniRQLQ)

The HRQoL scores indicated that patients were 'hardly troubled' or 'only somewhat troubled' by their AR (mean 2.1 ± 1.3). The overall mean was similar for patients with PAR (2.0 ± 1.3), SAR (2.1 ± 1.3) and SAR + PAR (2.3 ± 1.2). Allergic rhinitis had a significantly greater impact on HRQoL in patients with severe disease than in those with mild disease (2.6 ± 1.5 vs 2.1 ± 1.2 ; $P < 0.001$). Overall, the mean HRQoL score was 1.6 ± 1.1 for patients with mild disease compared with 2.3 ± 1.2 for patients with moderate disease, and 2.6 ± 1.5 for patients with severe disease. Health-related quality of life was also negatively correlated with the number of symptom-free days in the past 4 weeks (Pearson's correlation coefficient -0.48 , $P < 0.001$). Allergic rhinitis had a significantly greater impact in patients with more persistent disease than in those with intermittent disease (2.3 ± 1.3 vs 1.9 ± 1.2 ; $P < 0.001$).

Discussion

This pan-European survey of patients with AR found that burden of symptoms and impact of AR was high among patients presenting to their specialists or primary care physician for routine clinical care. A significant proportion of patients had moderate–severe disease (67.2%) and/or persistent symptoms (42.5%) according to physicians' assessments. These findings are consistent with the findings by Bachert et al. (2006) (16) who reported that approximately 40% of patients with AR compared with 23.5% of patients with non-allergic rhinitis present with persistent symptomatology. Indeed, the evidence from this and other surveys has found that the majority (approximately 75%) of patients seeking medical help suffer from moderate–severe forms of rhinitis (based on symptom intensity) (16).

Nevertheless, physicians significantly underestimated the prevalence of moderate or severe disease compared with patients' assessment (67.2% *vs* 73.1%). Greatest concordance between physicians and patients in terms of the assessment of disease severity was observed in France and Italy, whereas the greatest divergence in the views between patients and physicians was observed in the UK. In total, 84% of patients in the UK considered that their disease was moderate–severe in nature compared with an estimate of 57% by physicians. However, the discrepancy between physicians' and patients' assessment of moderate–severe disease was much lower in France (71.0% *vs* 73.5%) and Italy (72.3% *vs* 69.5%). The UK physicians were also much less likely than physicians in other European countries to record the presence of troublesome symptoms and to achieve good disease control. These findings may reflect the lower proportion of patients recruited by specialists from the UK compared with the rest of Europe (16.1% *vs* 38.6%).

Overall, the burden of symptoms was high. Only one in 10 patients (9.2%; $n = 136$) reported being symptom-free in the 4 weeks prior to the survey. On average, patients were symptom-free for only two out of the past 4 weeks. Regardless of the initial diagnosis, the majority (approximately 80% of patients) indicated that AR had at least some impact on their daily lives, and for 13% of patients, this impact was moderate or severe. Moreover, 71% of patients reported suffering from nasal and ocular symptoms either currently or frequently and one-third of all patients described their current symptoms as moderate or severe in nature. Confirming findings from a previous survey (17), patients with SAR appeared to have greater ocular involvement and more irritative symptoms (sneezing and itchy nose) than patients with PAR. Beyond nasal and ocular symptoms, a significant proportion of patients also reported symptoms such as cough (22.2%), headache (28.0%), nocturnal waking (27.0%) and wheezing (15.0%).

It would seem that physicians may not only underestimate the severity of disease but also the nature and

severity of AR symptoms. Physicians significantly underestimated the percentage of patients who suffered from ocular symptoms and headache, as well as more chronic pervasive symptoms, such as cough, wheezing and nocturnal waking. Asthma is often underdiagnosed among patients with AR (18). Nevertheless, a recent study has shown that a simple self-administered questionnaire is as effective as spirometry in discriminating between those with and without asthma thus identifying patients with AR who might benefit from further investigation and treatment (19).

Overall, > 50% of all patients reported that their AR had some impact on their sleep patterns in the past month. The evidence from previous studies has suggested that poorly controlled symptoms contribute to sleep loss or disturbance (20, 21), and result in daytime fatigue and decreased overall cognitive functioning. Sleep is significantly more impaired in patients with severe disease than in those with mild disease (22).

The survey was conducted between February and April and so the prevalence and severity of symptoms, as well as the miniRQLQ scores, are likely to be lower than during the peak pollen season when pollen is likely to be an important trigger in most patients with SAR and some patients with PAR (23). Nevertheless, the results of miniRQLQ are similar to previous studies performed with patients with AR (8, 24), ranging from 1.7 to 3.0 depending on the nature and frequency of symptoms, and show that all patients with AR consulting in primary care have a significantly greater score than healthy subjects of a similar age (9). Allergic rhinitis had a significantly greater impact on HRQoL in patients with moderate–severe or persistent disease. As well as the level of environmental triggers at the time of survey, it is likely that the miniRQLQ scores reflected the control of symptoms. Although there is good evidence that effective treatment can improve the HRQoL of AR sufferers (25), only 50% of patients had symptoms that were 'well' or 'completely' controlled according to the physicians' assessments. A significant proportion of patients presented with severe ocular and nasal symptoms during the current visit at the time of survey.

Consistent with findings from previous surveys (26–28), the current survey demonstrated that the intermittent or persistent nature of AR is not determined by the predominance of SAR or PAR. Overall, 40.0% of patients with seasonal symptoms and 46.3% with perennial symptoms in this survey had persistent disease. These results highlight the difficulty in classification of patients according to seasonal and perennial symptoms, because the pollen season is often long (starting in spring and ending in autumn) (29) and nasal irritation may be prolonged for weeks beyond the time of pollen exposure (30). Moreover, most patients are likely to be sensitized to both pollen and perennial allergens, such as house dust mites (31). Nevertheless, physicians diagnosed only a small percentage (3.9%) of patients in this survey with

SAR + PAR. Within this group, patients were significantly more likely to present with persistent disease than those diagnosed with SAR alone (56.9% vs 40.3%; $P < 0.05$). Moreover, patients with persistent disease were significantly more likely to present with a higher symptom burden and comorbidities such as asthma. Evidence from a previous survey (26) found that patients with persistent disease tended to present with more severe symptoms, and higher rate of self-awareness and previous diagnosis of AR.

However, 70% of patients included in this survey were diagnosed with seasonal symptoms only. It is likely that this result reflects the bias by physicians, who are much more likely to identify patients with SAR compared with PAR. In 1991, Sibbald and Rink (31) examined 7702 adults registered with a group of general practices based in London, UK, and found that patients with SAR were twice as likely to be diagnosed as having AR by their doctor, compared with those with PAR.

The survey showed that approximately one-third of patients with AR had comorbid asthma. Of these patients, three-quarters were considered by their physician to have moderate or severe disease. This is consistent with findings from previous surveys, which have shown that asthma is more prevalent among AR patients with more severe (moderate-severe vs mild), persistent disease and a confirmed diagnosis of allergy (10). Despite the more severe nature of the disease, the results from our

survey show that physicians considered that symptom control for AR among these patients was similar to those without comorbid asthma, with approximately 50% of patients achieving optimal control of their symptoms.

In conclusion, AR remains a significant health problem because of the high burden of uncontrolled symptoms, which have an impact on sleep, general well being and HRQoL among patients consulting for this condition. This pan-European survey demonstrates that physicians may not be fully aware of the nature and severity of symptoms experienced by patients. Moreover, physicians significantly underestimated the prevalence of moderate or severe disease compared with patients' assessments. These results highlight the need for more objective discussion between patients and physicians on the nature, severity and impact of symptoms and treatment approaches and how to obtain maximum benefit from currently available prescription medications.

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