

Original article

A survey of the burden of allergic rhinitis in the USA

Background: A prospective, cross-sectional, international survey was conducted among patients and physicians to identify symptom perception and the impact of allergic rhinitis (AR) on health-related quality of life (HRQoL). This paper presents the results from the USA.

Methods: Data were recorded by 447 patients and matched with data collected on these patients by primary care physicians or specialists. Tests to confirm a diagnosis of AR had been performed on 345 (77.2%) patients. Because of the intermittent nature of the disease, both physicians and patients recorded the presence, severity and impact of symptoms at the time of consultation, in addition to symptoms frequently, but not currently, present. Health-related quality of life was assessed using the Mini Rhinoconjunctivitis Quality of Life Questionnaire.

Results: According to the physicians' assessment, a large proportion of patients had moderate or severe disease (62.6%; $n = 280$), persistent disease (47.0%; $n = 213$) and comorbidities such as asthma (28.4%; $n = 127$). Comparison of the physicians' and patients' assessment of disease severity found that patients rated their disease as more severe than physicians across all three types of AR ($P < 0.001$). At the time of the consultation, 44.0% ($n = 197$) of patients were suffering from nasal and ocular symptoms, and 23.7% ($n = 106$) of all patients reported that their current nasal and ocular symptoms were moderate or severe in nature. More than 50% of the patients surveyed (56.4%; $n = 252$) were using two or more medications for their AR. Health-related quality of life correlated negatively with the number of symptom-free days in the previous 4 weeks. Allergic rhinitis had a significantly greater impact on patients with more persistent disease compared with those with intermittent disease (2.3 ± 1.3 vs 1.4 ± 1.1 ; $P < 0.001$); nevertheless, approximately two-thirds of patients with intermittent disease reported some impairment of their professional or daily life as a result of AR.

Conclusions: The results of this survey highlight the unmet needs of the many patients in the USA who present during routine care with moderate or severe and/or persistent disease and an associated high symptom burden and impaired HRQoL.

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Key words: allergic rhinitis; burden; health-related quality of life; survey; USA

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MS declares no conflicts of interest

Accepted for publication 6 August 2007

An estimated 14.1 million visits to a physician office are attributed to allergic rhinitis (AR) in the USA each year (1). In 2000, more than US\$6 billion was spent on prescription medications for this condition (2). The prevalence of AR has increased substantially over the past 15 years and is now estimated to affect between 9.9% and 16% of the USA population. Today an estimated 50 million Americans are thought to be affected by this disease (3).

In addition to the characteristic nasal and ocular symptoms of AR, patients can also experience fatigue, headache, disrupted sleep patterns and declines in cognitive processing, psychomotor speed, verbal learning and memory. As a result, AR can cause significant impairment to health-related quality of life (HRQoL) (4) and many people experience diminished productivity and

learning, which had an estimated indirect cost of US\$3.8 billion in 1996 (5).

A prospective, cross-sectional, international survey was conducted among patients and physicians to identify perceptions of symptoms and the impact of AR on HRQoL. In this paper, results from the sample of physicians and their patients in the USA are presented.

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 (6).¹ Physicians completed a patient record form (PRF) for each patient, and patients were invited to complete 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 symptoms 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

Allergic rhinitis is an intermittent disease; therefore, physicians and patients recorded both the presence and severity of symptoms at the time of consultation, as well as symptoms that were frequently, but not currently, present. Health-related quality of life was assessed using the Mini Rhinoconjunctivitis Quality of Life Questionnaire (miniRQLQ); a validated, disease-specific questionnaire developed to measure the functional problems in adults with rhinoconjunctivitis (7). 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 (the need to rub eyes and blow nose repeatedly), as well as nasal, ocular and other symptoms.

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]. If these tests were significant ($P < 0.05$) further statistical tests were conducted on pair-wise sub-group comparisons. In these comparisons, *t*-tests were used to compare means, and Fisher's exact tests or Pearson's 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 (8), 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 ordinal or binary in nature.

Results

Patient characteristics

Data were recorded for 447 patients, of whom 58.4% ($n = 261$) were recruited by primary care physicians and

the remainder were recruited by specialists (including allergy specialists and ear, nose and throat doctors). Most patients were consulting for AR including: one-third (32.7%; $n = 146$) for routine follow-up, 18.6% ($n = 83$) for repeat prescriptions and 14.8% ($n = 66$) for worsening symptoms. At the time of the survey, 10.1% ($n = 45$) of patients were consulting for reasons unrelated to their AR.

Diagnostic tests had been performed, either during the follow-up visit or at a prior visit, on 77.2% ($n = 345$) of patients to confirm a diagnosis of AR. These included skin prick testing in 59.3% ($n = 265$) of patients, measurement of specific IgE (radioallergosorbent test) in 6.0% ($n = 26$) of patients; measurement of total IgE levels in 14.0% ($n = 61$) and nasal allergen challenge in 1.6% ($n = 7$) of patients. Patients may have taken more than one test.

The patient characteristics and common triggers for AR, as assessed by the physician, are summarized in Table 1. Perennial AR was diagnosed in 65.5% ($n = 293$) patients, of whom 29.3% ($n = 86$) also suffered from SAR and, therefore, had a diagnosis of SAR + PAR. Seasonal AR was diagnosed in 53.7% ($n = 240$) of patients of whom 23.3% ($n = 86$) had a diagnosis of SAR + PAR.

Overall, 47.0% ($n = 213$) of the patients surveyed had persistent disease (defined as symptoms experienced on > 4 days/week and for > 4 consecutive weeks); however, the frequency of symptoms varied markedly according to the type of disease. Persistent symptoms were recorded among 57.0% of patients with PAR ($n = 118$) or SAR + PAR ($n = 49$) compared with 30.0% ($n = 46$) of patients with SAR ($P < 0.01$). Conversely, 70.0% ($n = 108$) of patients with SAR had intermittent symptoms (defined as symptoms for < 4 days/week or < 4 consecutive weeks), compared with 43.0% of patients with SAR + PAR ($n = 37$) and PAR ($n = 89$) ($P < 0.01$).

Medications used by patients were nonsedating antihistamines (NSA) [31.5% ($n = 141$) of patients], intranasal corticosteroids (INS) (21.5%; $n = 96$), or a combination of these two treatments (42.3%; $n = 189$). More than half of patients (56.4%; $n = 252$) were using two or more medications for their AR. Patients with severe AR were more likely to be prescribed combination therapy ($P < 0.01$) than were those with moderate or mild disease, and 73.8% ($n = 138$) of patients who were currently taking an NSA + INS had moderate or severe disease.

Comparison of the physicians' and patients' assessment of disease severity found that patients rated their disease as more severe than did physicians across all three types of AR ($P < 0.001$). Overall, 62.6% ($n = 280$) of patients had moderate or severe disease according to the physicians' assessment compared with 73.6% ($n = 329$) according to the patients' assessment (Fig. 1). Compared with the physicians' assessments, the patient-reported incidence of severe disease was two- to three-fold higher for all types of

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.

Table 1. Characteristics of patients in the USA according to type of allergic rhinitis (physicians' assessment)

	SAR + PAR (<i>n</i> = 86)	PAR (<i>n</i> = 207)	SAR (<i>n</i> = 154)	Total (<i>n</i> = 447)
Type of allergic rhinitis (% of total)	19.2	46.3	34.5	100.0
Age (years)				
Mean ± SD	41.71 ± 16.90 ^b	41.37 ± 16.76 ^c	36.38 ± 15.12	39.72 ± 16.38 ^d
Age groups, <i>n</i> (%)				
12 to <18 years	10 (11.6)	10 (4.8)	16 (10.4)	36 (8.1)
18 to 64 years	68 (79.1)	172 (83.1)	133 (86.4)	373 (83.4)
≥65 years	8 (9.3)	25 (12.1) ^c	5 (3.2)	38 (8.5) ^d
Sex, <i>n</i> (%)				
Female	56 (65.1)	126 (60.9)	90 (58.4)	272 (60.9)
Male	30 (34.9)	81 (39.1)	64 (41.6)	175 (39.1)
Duration since diagnosis (years)				
Mean ± SD	15.00 ± 14.02 ^{a,b}	10.84 ± 11.27	8.48 ± 9.75	10.84 ± 11.59 ^d
Frequency of symptoms, <i>n</i> (%)				
Intermittent*	35 (41.7)	88 (43.6)	101 (69.7) ^{b,c}	224 (52.0) ^d
Persistent†	49 (58.3) ^b	114 (56.4) ^c	44 (30.3)	207 (48.0) ^d
Disease severity, <i>n</i> (%)				
Mild	21 (24.4)	74 (35.9)	71 (46.7) ^b	166 (37.4) ^d
Moderate/severe	65 (75.6) ^b	132 (64.1)	81 (53.2)	278 (62.6) ^d
Common triggers (≥25%), <i>n</i> (%)				
Pollen	82 (95.3) ^{a,b}	135 (65.2)	130 (84.4) ^c	347 (77.6) ^d
Dust mites/house dust	74 (86.0) ^b	157 (75.8) ^c	45 (29.2)	276 (61.7) ^d
Animal fur	61 (70.9) ^b	119 (57.5) ^c	37 (24.0)	217 (48.5) ^d
Molds	49 (57.0) ^b	114 (55.1) ^c	41 (26.6)	204 (45.6) ^d
Tobacco smoke	24 (27.9) ^b	68 (32.9) ^c	21 (13.6)	113 (25.3) ^d
Common comorbidities (≥5%), <i>n</i> (%)				
Asthma	27 (31.4)	69 (33.3) ^c	31 (20.1)	127 (28.4) ^d
Sinusitis	20 (23.3) ^b	27 (13.0)	9 (5.8)	56 (12.5) ^d
Anxiety	7 (8.1)	22 (10.6)	13 (8.4)	42 (9.4)
Depression	6 (7.0)	27 (13.0)	9 (5.8)	42 (9.4) ^d
Smoking status, <i>n</i> (%)				
Never smoked	67 (82.7)	144 (77.4)	118 (86.1)	329 (81.4)
Ex-smoker	11 (13.6)	32 (17.2)	14 (10.2)	57 (14.1)
Current smoker	3 (3.7)	10 (5.4)	5 (3.6)	18 (4.5)
Recruiting physician (%)				
Primary care	18.6	58.9 ^a	79.9 ^{b,c}	58.4 ^d
Allergy specialist	81.4 ^{a,b}	41.1 ^c	20.1	41.6 ^d

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

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

† Persistent: symptoms on >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.

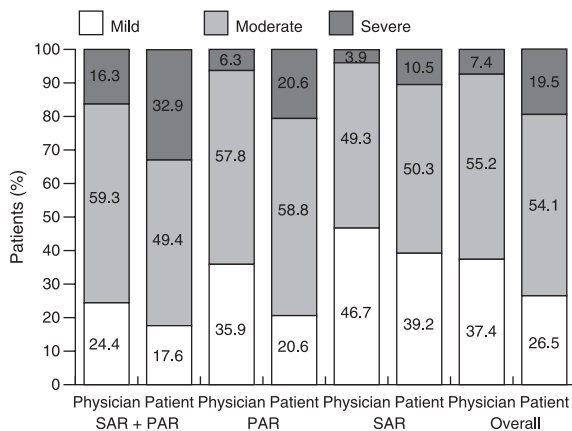


Figure 1. Disease severity reported by physicians and patients in the USA.

AR: SAR + PAR [32.9% (*n* = 28) vs 16.3% (*n* = 14)], PAR [20.6% (*n* = 42) vs 6.3% (*n* = 13)] and SAR [10.5% (*n* = 16) vs 3.9% (*n* = 6)] and these differences were statistically significant (*P* < 0.05). The Kappa statistical test determined a moderate level of agreement on disease severity between physicians and patients for those with SAR, a lower level of agreement for PAR and the least agreement for SAR + PAR.

Asthma (28.4%) and sinusitis (12.5%) were the most common comorbidities in patients with AR, but 9.4% of patients reported anxiety and a similar proportion reported depression (Table 1). A current or past diagnosis of asthma was more common in patients with PAR compared with SAR [33.3% (*n* = 69) vs 20.1% (*n* = 31); *P* < 0.05]; reflecting this, significantly more patients with PAR than SAR reported wheeze. Sinusitis was more common in patients with SAR + PAR (23.3%; *n* = 20) than in

patients with either PAR (13.0%; $n = 27$) (ns) or SAR (5.8%; $n = 9$) ($P < 0.01$). There were no statistical differences between the groups for other comorbidities.

Symptomatology

Similar types of symptoms were reported by patients and physicians for each type of AR (Fig. 2). The most frequent patient-reported symptoms, currently or frequently present in more than 50% of patients, were: nasal congestion, sinus pressure, rhinorrhoea, postnasal drip, sneezing, itchy or red eyes and headache. Patients with PAR and mixed forms of rhinitis reported more symptoms (either currently or frequently present) than patients with SAR (Fig. 2; $P < 0.01$). In patients with PAR and mixed forms of rhinitis, there was a greater ($P < 0.05$) incidence of congestive symptoms (sinus pressure, blocked nose and snoring) compared with patients presenting with SAR alone (Fig. 2). Patients with persistent disease were more likely to report the presence of sore throat [22.7% ($n = 47$) vs 15.2% ($n = 34$); $P < 0.05$], cough [26.6% ($n = 55$) vs 18.3% ($n = 41$); $P < 0.05$], sneezing [57.5% ($n = 119$) vs 44.6% ($n = 100$); $P < 0.01$], runny nose [67.7% ($n = 40$) vs 49.6% ($n = 111$); $P < 0.001$] and postnasal drip [69.1% ($n = 143$) vs 51.8% ($n = 116$); $P < 0.001$] than patients with intermittent disease; nonetheless, the incidence of symptoms reported by patients with intermittent disease was not insignificant.

Most patients (98.0%; $n = 438$) reported suffering from at least one symptom; 96.0% ($n = 429$) of patients suffered from two or more symptoms. At the time of the consultation, however, only 44.0% ($n = 197$) of patients reported suffering from nasal and ocular symptoms and 23.7% ($n = 106$) of all patients reported that their 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 15.0 days over 4 weeks (13.5 days for patients with PAR, 18.0 days for patients with SAR and 14.1 days for patients with SAR + PAR). Symptom-free days were more common in patients with mild disease (mean 18.2 ± 9.5) than in patients with moderate or severe disease (mean 13.2 ± 9.6 ; $P < 0.01$). Thirteen per cent ($n = 58$) of patients reported being symptom-free during the 4 weeks prior to the survey. More patients with SAR (17.0%; $n = 26$) were symptom-free during the prior 4 weeks than patients with PAR (12.0%; $n = 25$) or both (8.0%; $n = 7$), but these differences were not statistically significant.

According to the physicians' assessment, nasal symptoms were 'well' or 'completely' controlled in 49.7% ($n = 221$) of patients and 'poorly' controlled in 14.8% ($n = 66$) of patients over a 4-week period. Similarly, physicians reported that ocular symptoms relating to rhinitis were 'well' or 'completely' controlled in 54.3% ($n = 243$) of patients but 'poorly' controlled in 5.8% ($n = 26$) of patients. Significantly fewer patients with SAR + PAR had 'well' or 'completely' controlled nasal

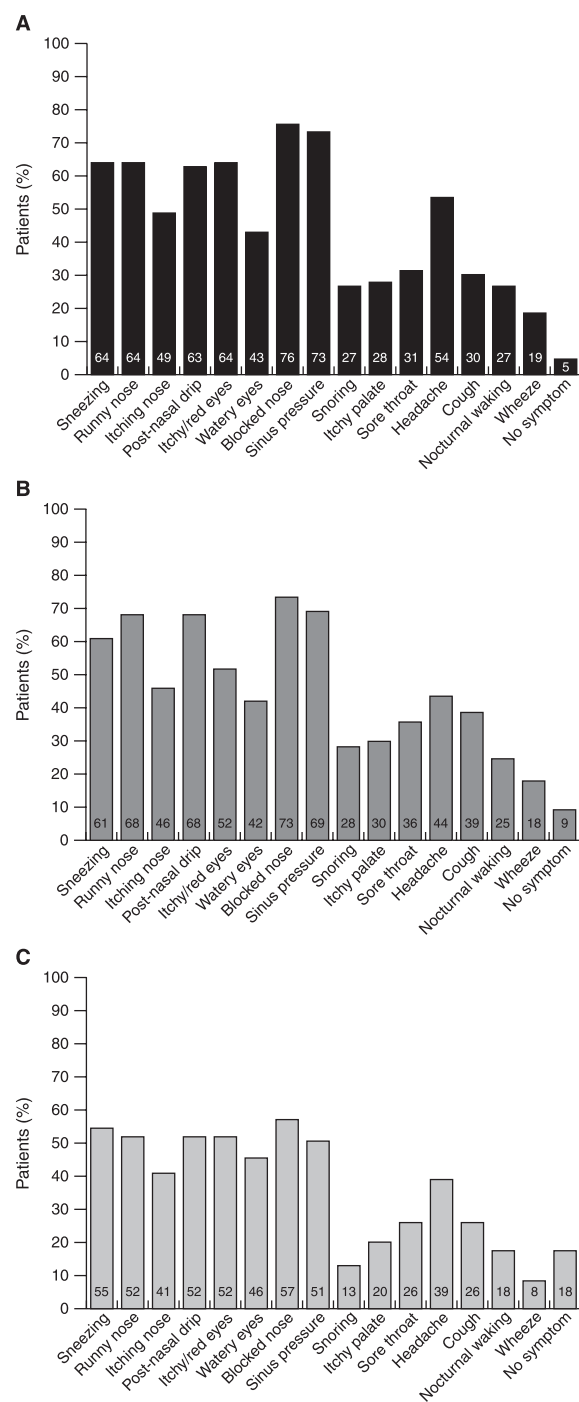


Figure 2. Patient-reported symptoms in the USA (currently or frequently present) for patients with seasonal allergic rhinitis (SAR) + perennial allergic rhinitis (PAR) (2A), PAR (2B) and SAR (2C). Patients recorded symptoms as frequently present only if not currently present.

symptoms compared with patients with SAR [38.8% ($n = 33$) vs 60.1% ($n = 93$); $P < 0.01$] or PAR [38.8% ($n = 33$) vs 46.4% ($n = 96$); $P < 0.05$]. There was no significant difference in the control of symptoms between patients with SAR and those with PAR.

More than half (58.4%; $n = 261$) of patients across all groups, and 72.1% ($n = 62$) of patients with SAR + PAR, indicated that their AR symptoms were mainly bothersome immediately after waking. At least one-third of patients also reported bothersome symptoms at other times of day, while 44.6% ($n = 199$) and 29.1% ($n = 130$) of patients were concerned by symptoms in the evening or at night, respectively.

According to the patients' assessment of symptoms, nasal and ocular symptoms were frequently the most troublesome: 58.8% ($n = 263$) of patients reported nasal symptoms and 13.6% ($n = 61$) of patients reported itchy/red eyes or watery eyes, as the most troublesome symptom. Of the 54.0% ($n = 241$) of patients who had red/itchy eyes, 17.4% ($n = 42$) considered that this symptom was the most troublesome.

Compared with the patient-reported incidence of currently or frequently present symptoms, physicians tended to overestimate the incidence of blocked nose, while significantly ($P < 0.05$) underestimating the incidence of sneezing, ocular symptoms, sinus pressure, sore throat, headache, snoring, nocturnal waking, cough and wheezing (Table 2).

Comorbidity of asthma

The physician-reported incidence of moderate or severe AR was significantly higher in patients with asthma than in those without asthma [73.0% ($n = 93$) vs 58.5% ($n = 187$); $P < 0.005$]. Physicians also reported a higher incidence of nocturnal waking [21.3% ($n = 27$) vs 12.2% ($n = 39$); $P < 0.05$], wheeze [21.3% ($n = 27$) vs 1.3% ($n = 4$); $P < 0.001$], cough [33.1% ($n = 42$) vs 18.4% ($n = 59$); $P < 0.01$] and sore throat [27.6% ($n = 35$) vs 15.3% ($n = 49$); $P < 0.01$] in patients with asthma vs patients without asthma. Consistent with the

overall analysis, the patient-reported incidence of symptoms was higher than the physician-reported incidence of symptoms in patients with asthma. Significantly, more patients than physicians reported the presence of cough, wheeze, sore throat, sinus pressure, headache, ocular symptoms and rhinitis (sneezing and runny nose) among patients with asthma. Patients with asthma tended to have less well-controlled symptoms. Fewer patients with asthma had 'well' or 'completely' controlled symptoms according to the physicians' assessment than patients without asthma [45.6% ($n = 57$) vs 55.4% ($n = 169$)], although this difference was not statistically significant.

Impact on sleep and daily activities

For approximately 50% of patients, the symptoms of AR had a significant impact on sleep patterns on some occasions over the previous month: 48.3% ($n = 201$) of patients had trouble falling asleep; 51.6% ($n = 212$) woke several times in the night, and 52.8% ($n = 218$) had trouble staying asleep.

More patients with persistent disease than patients with intermittent disease reported that during the previous month they had, on some occasions, experienced difficulty in falling asleep [63.8% ($n = 127$) and 40.6% ($n = 88$); $P < 0.001$, respectively], awoke during the night [58.5% ($n = 114$) and 39.4% ($n = 85$); $P < 0.001$] or had trouble staying asleep [58.6% ($n = 116$) and 36.7% ($n = 79$); $P < 0.001$] because of their AR symptoms. As a consequence, 77.9% ($n = 155$) of patients with persistent disease and 49.8% ($n = 108$) of patients with intermittent disease reported that they had not had sufficient sleep because of their AR on some occasions in the past month ($P < 0.001$).

The majority of patients reported that their AR symptoms had an impact on daily activities (75.4%; $n = 337$) or work/school performance (74.0%; $n = 331$). Nearly one in five patients (17.4%; $n = 78$) reported that their symptoms had a moderate or severe impact on daily activities and a further 11.0% ($n = 49$) reported a moderate or severe impact on school/work performance. For most patients with persistent and intermittent disease, AR had an impact on daily activities [83.8% ($n = 155$) and 66.3% ($n = 128$), respectively] as well as work/school performance [83.5% ($n = 111$) and 64.3% ($n = 90$)] in the previous 7 days.

The symptoms of AR also appeared to affect patients' mood: 61.0% ($n = 272$) of patients reported feeling tired, 38.0% ($n = 170$) reported feeling irritable, and 23.5% ($n = 105$) reported a general malaise (Fig. 3). One in five patients overall, and 28.0% ($n = 43$) of patients with SAR, reported that their AR had no impact on how they felt. Of patients with persistent and intermittent symptoms, a significant proportion reported feeling tired [67.0% ($n = 139$) vs 55.8% ($n = 125$); $P < 0.05$], irritable [42.0% ($n = 87$) vs 31.7% ($n = 71$); $P < 0.05$], sick [30.9% ($n = 64$) vs 17.0% ($n = 38$); $P < 0.05$], or

Table 2. Patient- and physician-reported incidence of symptoms (currently or frequently present) in the USA

Symptom	Physician reported (%)	Patient reported (%)	P-value
Sneezing	50.8	59.3	<0.01
Runny nose	58.4	61.7	ns
Itchy nose	44.5	44.7	ns
Postnasal drip	60.4	61.3	ns
Itchy/red eyes	43.2	54.1	<0.001
Watery eyes	36.9	43.4	<0.05
Blocked nose	73.6	68.2	<0.05
Sinus pressure	47.7	63.5	<0.001
Snoring	15.7	22.4	<0.01
Itchy palate	20.4	26.4	<0.05
Sore throat	18.8	31.5	<0.001
Headache	26.0	43.8	<0.001
Cough	22.6	32.7	<0.001
Nocturnal waking	14.8	22.6	<0.001
Wheeze	6.9	14.8	<0.001

ns, not significant.

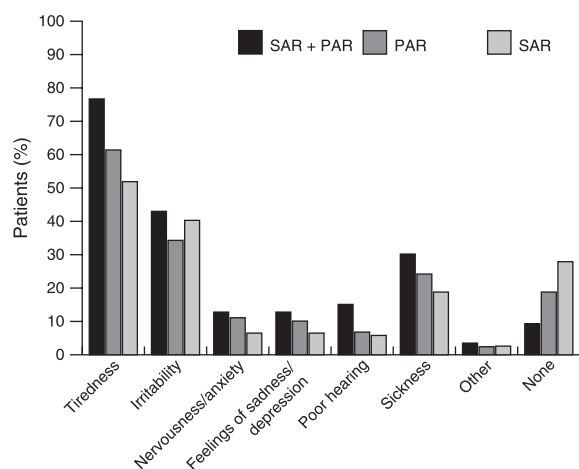


Figure 3. The impact of allergic rhinitis on how American patients felt.

experienced nervousness or anxiety because of their AR [13.5% ($n = 28$) vs 6.3% ($n = 14$); $P < 0.05$].

Health-related quality of life (miniRQLQ)

The HRQoL scores indicated that patients were 'hardly troubled' or 'only somewhat troubled' by their AR (mean 1.8 ± 1.3). The overall mean was smaller for patients with SAR (1.6 ± 1.2) than for those with PAR (1.9 ± 1.2) or SAR + PAR (2.0 ± 1.4), although these differences were not statistically significant. Allergic rhinitis had a more detrimental impact on HRQoL in comorbid asthma patients compared with nonasthma patients (2.0 ± 1.3 vs 1.7 ± 1.2 ; $P < 0.05$). Overall, the mean HRQoL score was 1.3 ± 1.2 for patients with mild disease compared with 2.1 ± 1.2 for patients with moderate disease, and 2.3 ± 1.2 for patients with severe disease ($P < 0.001$ for mild vs moderate and mild vs severe). Health-related quality of life was negatively correlated with the number of symptom-free days in the past 4 weeks (Pearson's correlation coefficient -0.6 , $P < 0.001$). Consistent with this finding, AR had a significantly greater impact on patients with persistent disease than on patients with intermittent disease (2.3 ± 1.3 vs 1.4 ± 1.1 ; $P < 0.001$).

Discussion

This survey, conducted among 447 patients with AR presenting to their specialist or primary care physician for routine clinical care, found that a significant proportion of patients had moderate or severe disease (62.6%), persistent symptoms (47.6%) and comorbidities such as, asthma (28.8%), sinusitis (12.5%) and anxiety and depression (9.4%). As reflected in this and other surveys, AR imposes a substantial, and often underestimated, burden on individuals in terms of HRQoL and work

productivity (4, 9). Three-quarters of patients in this survey considered that their symptoms had an impact on their daily activities or work/school performance.

The burden of AR is greatest in patients with PAR (10). Compared with patients with SAR, our survey found that patients with PAR (with or without SAR) tended to present with more frequent and severe symptoms, and significantly more comorbidities, such as asthma and sinusitis.

Consistent with findings from previous surveys (11–14), the survey found a high symptom burden among patients who present to their physician with AR. The most frequent patient-reported symptoms were: nasal congestion, sinus pressure, rhinorrhoea, postnasal drip, sneezing, itchy or red eyes and headache. Generally, the survey found good agreement between patients and physicians in the reporting of nasal symptoms. However, there was much greater disparity between physicians and patients in the reporting of symptoms, such as sneezing, ocular symptoms, sinus pressure, sore throat, headache, snoring, nocturnal waking, cough and wheezing. Moreover, there was an underappreciation by physicians of the perceived severity of the disease among the patients surveyed. Few patients perceived their condition as mild compared with their physicians' assessments, and the patient-reported incidence of severe disease was two- to three-fold higher than physicians' assessment. These disparities in the reporting of disease severity could, in part, reflect the fact that many patients were consulting their physician for routine follow-up and only 14.8% were consulting for worsening symptoms. Physicians' impression of disease severity is likely to reflect symptom profile at the time of consultation, whereas patients are likely to reflect the overall burden of disease over a longer period of time. Recognizing this, the Allergic Rhinitis and its Impact on Asthma (ARIA) classification recommends that disease severity should be evaluated according to the impact of AR on four HRQoL parameters (sleep, daily activities/sport, work/school and troublesome symptoms) (15). Based on this classification, physicians would have rated at least 62.4% of patients with moderate disease (one or two components) and a further 17.9% of patients with severe disease (three or four components), which correlates well with the patient-reported incidence of moderate disease (54.1%) and severe disease (19.5%). These results suggest that, for patients, the intensity and impact of symptoms on HRQoL are more important than a comprehensive listing of symptoms of rhinitis and, therefore, should determine the level of treatment (16).

The survey provided a useful point-in-time description of allergy patients in early spring showing that, although the frequency of symptoms was high, few patients had severe symptoms. Indeed, 87% of patients had experienced symptoms over the 4 weeks prior to the survey but only one-quarter of patients reported that their nasal and ocular symptoms were moderate or severe in nature at the time of the consultation.

On average, patients reported that AR had a low impact on HRQoL (mean 1.8 ± 1.3) compared with a previous study in patients with AR (mean 2.8; range: 2.1–3.5) (17). It is likely that the low miniRQLQ scores in this survey reflected both the control of symptoms as well as the level of environmental triggers at the time of survey. Indeed the miniRQLQ scores were similar to baseline scores measured by Laforest et al. (2005) (18) in SAR patients prior to the peak pollen seasons. However, during peak grass pollen counts, in the summer months, the impact of AR on HRQoL would be expected to increase significantly, especially in patients with SAR (with or without PAR), as well as in the two-thirds of patients with PAR for whom pollen was considered to be an important trigger, according to the physicians' assessments. Consistent with the findings from previous studies (19, 20), the survey found a statistically significant increase in the impact of AR on HRQoL with increasing disease severity and days with symptoms; although again the miniRQLQ scores were low (2.3 ± 1.2 for patients with severe disease) compared with other studies where the RQLQ scores are commonly reported to be between 2.7 and 3.0 for patients with moderate or severe AR (17, 21).

In common with another recent survey (22), AR was found to have a profound effect on sleep. Approximately 50% of patients declared that their AR was associated with sleep disturbances, daytime somnolence and fatigue. The exact relationship between rhinitis and sleep disturbance is unknown; however, both the symptoms and underlying pathology of the disease can interfere with sleep quality. Nasal congestion, which has been shown to cause sleep-disordered breathing, is thought to be primarily responsible for rhinitis-related sleep disorders. Notably, the severity of nasal congestion follows a circadian rhythm, being worst at night and in the early morning (23). Most patients in our survey declared that their symptoms were mainly bothersome immediately after waking.

Despite the fact that more than 50% of the patients were using two or more medications for their AR and patients also had access to a wide array of over-the-counter remedies, good symptom control was achieved in only half of patients overall, and in even fewer (38.8%) patients with SAR + PAR, according to the physicians' assessments. Reflecting this, approximately 60% of patients reported that nasal symptoms continued to be the most troublesome symptom. These results point to a need for better communication between physicians and

patients on how to obtain maximum benefit from currently available prescription medications. Underutilization of certain medications, such as INS, for example, which should be administered even in the absence of symptoms (24), could be a factor contributing to the high rate of breakthrough symptoms and low levels of treatment satisfaction. Demonstrating proper administration techniques to patients and counseling them on reasonable expectations of time to clinical effect with all treatments is essential to avoid over-reliance on multiple agents and over-the-counter products (24).

Several limitations of this survey should be mentioned. Firstly, the survey is likely to reflect a certain recruitment bias because physicians did not enroll patients consecutively, but rather on an *ad hoc* basis. Secondly, the study was conducted between February and April and so is unlikely to reflect the true impact of the disease during seasons of higher pollen count. Thirdly, reflecting the disease classification when the survey was designed, patients were subdivided into those with SAR or PAR or SAR + PAR. However, in light of the ARIA Workshop Recommendations (15), patients might have been more usefully classified as intermittent or persistent, mild or moderate/severe. Notably, this survey found that approximately 57% of patients with PAR had persistent symptoms, which is consistent with the finding in a large survey reported by Demoly et al. (2003) (25) in more than 6000 patients. However, a greater number of SAR patients in our survey had intermittent symptoms (70% vs 55%) than in the previous survey by Demoly et al. (25).

In conclusion, this survey highlights the unmet needs of the many patients in the USA who present during routine care with moderate or severe and/or persistent disease and poor symptom control. There is a need for more effective discussion between patients and physicians on the impact of symptoms on daily functioning and sleep, and how to obtain maximum benefit from currently available prescription medications.

Acknowledgments

This analysis was funded by GlaxoSmithKline. The survey was developed and managed by Adelphi Group Products. The authors wish to acknowledge the contribution of Victoria Higgins, Richard Lawson and Clare Kennedy of Adelphi Group Products for their help with the statistical analysis, and Rae Hobbs of Innovex Medical Communications for the initial drafting of this manuscript.

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