Patient and healthcare-provider perspectives on the burden of allergic rhinitis

Michael S. Blaiss, M.D.,* Eli O. Meltzer, M.D.,# M. Jennifer Derebery, M.D.,§ and John M. Boyle, Ph.D.¶

ABSTRACT

Allergic rhinitis (AR) is a chronic inflammatory disease characterized by nasal itching, sneezing, rhinorrhea, and nasal obstruction. Although the incidence of AR has been increasing, the reported prevalence of AR differs among surveys. Allergies in America *was a comprehensive national survey that included 2500 adults diagnosed with AR and 400 healthcare practitioners who treat AR. Participants were interviewed about the burden of AR and comorbid conditions and the effect of AR on productivity and quality of life. Approximately 43% of nasal allergy sufferers reported that their nasal allergies were seasonal, and 56% indicated that their allergies were persistent throughout the year. Seasonal allergies were worse during the spring and fall, as reported by 56 and 45% of sufferers, respectively. Nasal congestion was ranked as the most common symptom experienced by patients daily or on most days during the worst month for nasal allergies. Patients and healthcare providers indicated that nasal congestion was the most bothersome symptom of AR. Asthma was diagnosed in 20% of patients with AR. Nasal allergy sufferers and healthcare providers indicated that nasal allergies affected productivity, led to missed workdays, and had a negative effect on patient quality of life. Patients and healthcare professionals report that symptoms of AR are bothersome. Effective treatment options for nasal symptoms of AR may decrease the burden of illness and improve patient productivity and quality of life.*

(Allergy Asthma Proc 28:S4–S10, 2007; doi: 10.2500/aap.2007.28.2991)

Key words: Allergic rhinitis, burden of illness, comorbidity, epidemiology, intranasal corticosteroids, perspectives, productivity, quality of life, sleep disturbance, symptoms

Allergic rhinitis (AR) is a chronic inflammatory disease characterized by nasal itching, sneezing, rhinorrhea, and nasal obstruction.[1] A significant number of AR patients also experience severe eye symptoms,[1] including eye itching, watering, and puffiness (*i.e.*, allergic conjunctivitis). The incidence of AR increases from infancy, peaks in childhood and adolescence, and decreases in the elderly.[2] An estimated 20–40 million Americans may be affected with AR; ~40% have perennial AR, 20% have seasonal AR, and 40% have perennial AR with seasonal exacerbations, depending on the allergen sensitivity.[3]

The estimated prevalence of AR in the United States ranges widely from 4 to >40%.[4–9] However, the reported prevalence and incidence of AR in the United States vary, depending on the method of data collection. In addition, the population prevalence and incidence of AR are not collected in national health surveys such as the National Health Interview Survey and the National Health and Nutrition Examination Survey. The National Health and Nutrition Examination Survey (NHANES III) found that >50% of the population tested positive to one or more allergens, and the prevalence was 2.1–5.5 times higher than that determined in the NHANES II survey.[8,10] The American Academy of Allergy, Asthma, and Immunology estimates that >40–50 million Americans suffer from allergic diseases.[7] The National Health Interview Survey estimates the rate of "hay fever" at 9%.[5] However, according to the International Survey of Asthma and Allergy in Children, the prevalence of "hay fever" has been estimated at ~16%.[6] Furthermore, the Agency for Healthcare Research and Quality has estimated a prevalence of AR at 10–30% of adults and up to 40% of children.[9] The wide variations in estimates among these surveys may exist because of the differences in definitions of the disease; variations in sampling time frames, as well as differences in data-collection methods; or inclusion of a low number of survey participants.

The *Allergies in America* survey was designed to use robust data-collection methods to examine the burden of AR in the adult population of the United States. The

*From the *University of Tennessee Health Sciences Center, Memphis, Tennessee, #Allergy and Asthma Medical Group and Research Center, San Diego, California, §House Ear Clinic, Los Angeles, California, and ¶Schulman, Ronca and Bucuvalas, Inc., New York, New York*

The Allergies in America *survey of nasal allergy sufferers was sponsored by ALTANA Pharma US and was conducted by the national opinion research organization Schulman, Ronca and Bucuvalas, Inc.*

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Address correspondence and reprint requests to Michael S. Blaiss, M.D., Department of Pediatrics, University of Tennessee Health Science Center, 7205 Wolf River Boulevard, Germantown, TN 38138

E-mail address: mblaiss@allergymemphis.com

survey is the largest and most comprehensive national survey to date. It was created to evaluate the burden of AR and comorbid conditions and their effects on productivity and quality of life. The other objective of the survey was to compare patient and healthcare provider perspectives on AR.

METHODS

Allergies in America: A Survey of Nasal Allergy Sufferers

The *Allergies in America* survey was composed of two distinct surveys, each of which consisted of telephone interviews with national randomly selected samples.

The National Survey of Nasal Allergy Sufferers. A national sample of adult patients with nasal allergies was obtained by systematically screening 30,927 households using a random-digit-dialing telephone survey. During the telephone screening, an adult member of each household was asked to report the total number of adults in the household and the total number of these individuals ≥18 years of age who had been diagnosed with nasal allergies. Patients ≥18 years of age who had been diagnosed by a physician as having AR, nasal allergies, or "hay fever" and had been either taking medication for AR or had AR symptoms during the past year were included in the survey. Telephone interviews were conducted between January 5 and January 31, 2006, and averaged 34.8 minutes in length.

The National Survey of Healthcare Professionals. A parallel survey was conducted among 400 healthcare practitioners, including a national sample of 300 physicians. Telephone interviews were conducted with national samples of three physician populations: adult primary care, allergists, and otolaryngologists (100 interviews were conducted in each of the three physician strata). The adult primary care population was defined as the medical specialties of general practice, family practice, and internal medicine. The samples were drawn as probability samples from the American Medical Association and the American Osteopathic Association Master List of physicians in the United States. The samples were restricted to physicians in these three specialty strata who were in active practice in direct patient care in an outpatient setting.

A fourth stratum of nurse practitioners and physician assistants completed the national survey of healthcare professionals. The nurse practitioner sample was drawn from state licensing board lists. The physician assistant sample was drawn from the membership list of the American Academy of Physician Assistants. A total of 50 interviews were completed in each stratum and were conducted by telephone using the same survey instrument as the physician survey. The interviews were conducted between January 17 and February 14, 2006, and averaged 19.4 minutes in length.

The maximum expected sampling error for a simple random sample of 2500 (*e.g.*, the patient survey) was ±1.2 percentage points at the 95% confidence level. The maximum expected sampling error for a simple random sample of 100 (*e.g.*, primary care physicians) was ±9.8 percentage points at the 95% confidence level.

The response and nonresponse rates were determined also. Screening interviews for survey eligibility were successfully completed in 30,927 households. Among the 2821 households with eligible respondents, detailed interviews were completed in 2500 (35% men and 65% women) households, which resulted in a response rate of 88.6%. Weights consisting of cross-tabulations and frequencies were used in all analyses to determine critical survey outcomes.

Development of Survey Questionnaire. Schulman, Ronca and Bucuvalas, Inc., and experts in the field of AR collaborated to develop this questionnaire, which would collect accurate and relevant information on AR. Survey questions were developed through analysis of the relevant literature and identification of questions used to study similar diseases in accepted health surveys. The AR patient questionnaire focused on general health, AR triggers, AR symptoms, effects of allergies on quality of life, and the effectiveness and side effects of nasal allergy medications.

Questions in the patient survey relevant to this publication are

1. Would you describe your nasal allergies as seasonal, or do they occur throughout the year?
2. During what times of the year are your nasal allergies the worst?
3. During the worst 1-month period of the past year, did you have [symptom] every day, most days a week, a few days a week, a few days a month, less than that, or never?
4. Which of the following nasal allergy symptoms are most bothersome to your patients?
5. Which of these symptoms was the most bothersome to you?
6. Have you ever been diagnosed with asthma?
7. Have you had asthma in the past 12 months?
8. During the last week have you had sinus problems, heartburn or gastroesophageal reflux disease, cold or flu, earaches, migraines, skin rashes, fever, pink eye, or none of the above?
9. Do your nasal allergies keep you from working full time?
10. On days when you had nasal allergy symptoms, how much did the symptoms interfere with your

ability to do your job? Did the symptoms interfere a lot, a moderate amount, some, only a little, or not at all?
11. Have you missed work in the past 12 months because of your nasal allergies?
12. Thinking about your productivity on a scale of 0–100, where 100 means 100% productivity, where would you rank your productivity on days when you do not have nasal allergy symptoms?
13. Where would you rank your productivity on the same scale of 0–100 when your nasal allergies are at their worst?

The questions in the healthcare professional survey relevant to this publication are

1. Do you classify the severity of nasal allergies in patients?
2. What proportion of your patients with nasal allergies would you classify as having seasonal rather than perennial allergies?
3. Which of these symptoms was the most bothersome to your patients?
4. For the average patient with AR, during allergy season, would you say the condition impacted their daily life a lot, impacted their daily life a moderate amount, impacted their daily life some, impacted their daily life a little, or did not really impact their daily life?
5. Thinking about productivity at work on a scale from 0–100, where 100 means 100% productivity, where would you rank the productivity of persons with AR when their nasal allergies are at their worst?

Weights were developed to correct for sampling bias. The weights corrected for differences between eligible patients screened and eligible patients actually interviewed. An age and gender correction was used to adjust results from the interviewed population so that they would be similar to those that would be expected from the screened population of allergy sufferers.

RESULTS

Burden of AR on Patients

Yearly Pattern of Allergy Symptoms. Fourteen percent of adults in the survey had a physician-confirmed diagnosis of AR and were symptomatic during the previous year of the study. This survey likely underreports the overall population prevalence of the disease because it does not include children or individuals without a formal healthcare provider–confirmed diagnosis of AR. When asked whether their nasal allergies were seasonal or persisted throughout the year, 43% of nasal allergy sufferers reported that their allergies were seasonal only, and 56% indicated that their allergies occurred throughout the year (Table 1). Of those who reported seasonal AR, 56% of patients indicated that their allergies were worse during the spring season, and 45% of patients reported that their allergies were worse during the fall season. The majority (>58%) of healthcare providers reported that they classified the nasal allergies of their patients as seasonal or perennial. Moreover, healthcare providers indicated that approximately one-half of their patients suffered from seasonal allergies.

Table 1 **Prevalence, seasonal severity, and symptoms of AR**

Parameter	Patients (%)
Prevalence	
Seasonal	43
Throughout the year	56
Not sure	1
Seasonal severity*	
Spring	56
Summer	21
Fall	45
Winter	23
Worst symptoms*	
Stuffy nose	60
Postnasal drip	46
Repeated sneezing	46
Runny nose	45
Watering eyes	40
Itching	35
Headache	25
Awake at night (unable to sleep)	22
Facial pain	21
Ear pain	12

**Patients were allowed to provide more than one response.*

Symptoms of AR. Stuffy nose was reported as the most common symptom (60%) experienced by patients daily or on most days during the worst month for nasal allergies (Table 1). Other most frequently experienced symptoms reported by patients during the worst month for nasal allergies included repeated sneezing (46%), postnasal drip (46%), and runny nose (45%).

Bothersome Symptoms and Severity. Nasal allergy sufferers indicated stuffy nose (22%), headache (14%), postnasal drip (14%), and itchy (10%) and watery (5%) eyes as the most bothersome symptoms associated with their nasal allergies (Fig. 1, *A* and *B*). In contrast, the majority of healthcare providers reported that the symptoms that are most bothersome to their patients included nasal congestion (94%), postnasal drip (75%), and runny nose (69%). Healthcare providers also re-

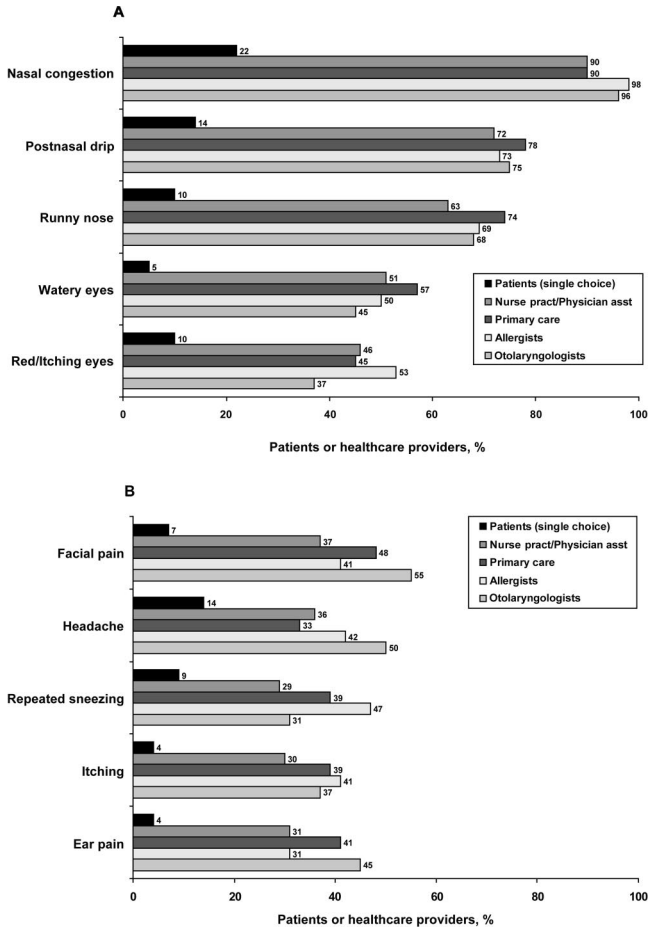

Figure 1. *(A and B) Patient and healthcare provider perspectives on the most bothersome symptoms of nasal allergies. Patient response was based on a single choice for the most bothersome symptom. Healthcare provider response was based on multiple responses.*

ported watery (51%) and itchy eyes (45%) among the most bothersome symptoms experienced by their patients (Fig. 1 *A*). Healthcare providers indicated that >60% of their patients had severe or moderate symptoms. Furthermore, the vast majority (>94%) of healthcare providers indicated that the symptoms were extremely or moderately bothersome to their patients.

Comorbid Conditions Associated with AR. When patients were asked whether they had been diagnosed with asthma ever in the past or in the past 12 months, 68% indicated that they had never been diagnosed with asthma previously. However, 20% of the patients reported having been diagnosed with asthma in the past 12 months (Table 2). Sinus problems were reported to be associated with nasal allergies in about one-half of the patients. Other comorbid conditions, with the exception of heartburn, were infrequently reported.

Table 2 **Comorbid conditions associated with AR**

Condition	Patients (%)
Previous diagnosis of asthma	
Never	68
Past 12 mos	20
Previously, but not in past 12 mos	12
Previous diagnosis of other conditions	
Sinus problems	50
Heartburn or GERD	23
Cold or flu	17
Earache	16
Migraine	15
Skin rashes	10
Fever	9
Pink eye	2
None of these	33

GERD = gastroesophageal reflux disease.

Table 3 **Burden of AR on patient productivity and quality of life**

Effect on Work and Productivity	%
Missed work because of allergies (patients)	
No	70
Yes	30
Level of interference with work (patients)	
Moderate	35
Some	28
A lot	20
Little	16
None	1
Reduction in productivity (mean)	
No symptoms	5
Symptoms at worst	28
Effect on daily life, patients	
Moderate	25
Some	26
Little	19
A lot	15
Did not really impact	14
Not sure	1

Burden of AR on Patient Productivity and Quality of Life. Approximately one-third of patients reported that their nasal allergies caused them to miss work (Table 3). Thirty-five percent of patients indicated that their nasal allergies moderately interfered with work. When allergy symptoms were at their worst, the mean productivity was ~72%, indicating a decrease in productivity of 23% during the allergy season from a mean productivity of 95% during the normal time of year. Allergies

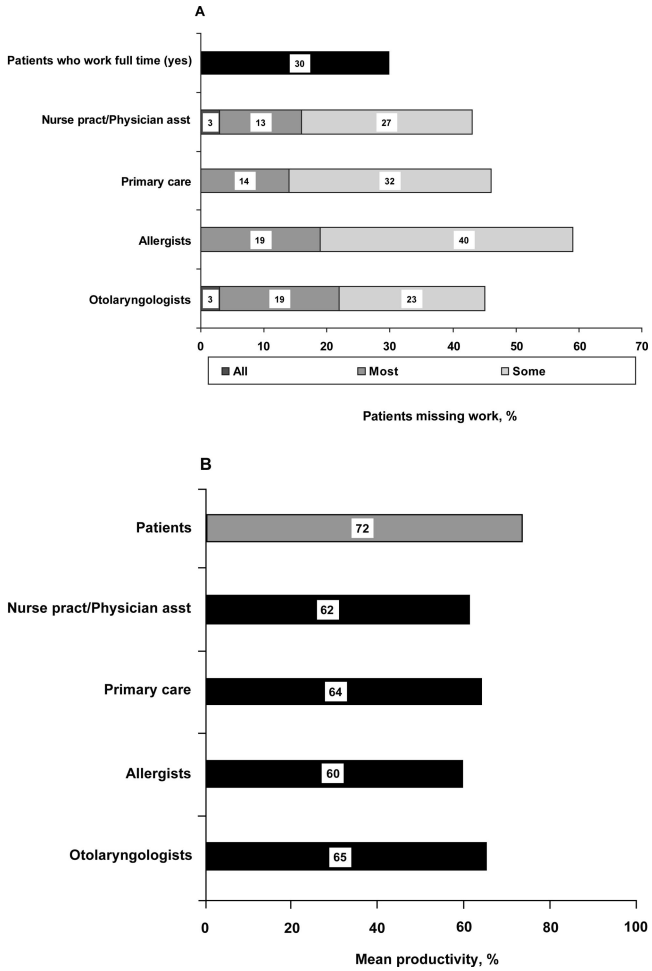

Figure 2. *Effect of nasal allergies on (A) work and (B) productivity among nasal allergy sufferers.* Patients who work full time *indicates the response from patients in full-time employment who missed work in the past 12 months because of nasal allergies.* All, *physician response that indicated effect on productivity in 91–100% of patients;* Most, *physician response that indicated effect on 51–90% of patients;* Some, *physician response that indicated effect on 11–50% of patients.*

affected daily lives to some or to a moderate extent in 51% of patients. Most healthcare providers (86%) believed that allergies affected the daily lives of their patients. Moreover, healthcare providers indicated that nasal allergies caused missed workdays in patients with AR (Fig. 2 *A*). Furthermore, all healthcare providers reported that nasal allergies affected patient productivity at work (Fig. 2 *B*), suggesting adverse economic consequences as a result of AR.

DISCUSSION

Epidemiological evidence suggests that the prevalence of AR in the United States and around the world is increasing.[4] However, it is difficult to achieve an accurate and reliable estimate of the prevalence of AR because of the wide variations among the surveys.[5,6,9,10] The *Allergies in America* survey was designed to overcome these variations by adopting optimal data-collection methods and using a relatively strict definition to estimate the burden of AR in the United States.

Allergies in America, one of the largest and most comprehensive national surveys conducted about AR, suggests that, based on patient and healthcare provider perspectives, nasal allergies persist in many patients throughout the year. Moreover, nasal allergy sufferers and healthcare providers relate that nasal congestion is the most bothersome symptom associated with nasal allergies. The survey also notes that the bothersome symptoms of AR decrease patient productivity and reduce quality of life. In a 2005 Roper Public Affairs and Media Internet survey of 1000 adults with allergies, the majority of participants indicated that they experienced allergy symptoms in the morning, with nasal congestion reported to be the most common symptom compared with other symptoms.[11] In another large survey of 2355 individuals with AR, 85% of individuals reported that they suffered from nasal congestion, which affected their quality of life and productivity.[12] In a large population-based cross-sectional survey of 15,000 households, the most commonly reported symptoms included runny nose, sneezing, nasal congestion, and tiredness.[13]

In this survey, patient and healthcare provider perspectives indicate that nasal allergy symptoms, including ocular symptoms, are bothersome to patients. Furthermore, physicians are aware of the degree of discomfort, particularly the bothersome symptoms, that their patients experience during a nasal allergy exacerbation. However, there were significant differences in patient and healthcare provider perceptions regarding the extent of the most bothersome symptoms of nasal allergies. Notably, bothersome symptoms are the primary reason that contributes to AR being among the 10 major reasons for primary care physician visits.[14] In this survey, nasal allergy sufferers and healthcare providers considered nasal congestion the most bothersome symptom associated with nasal allergies. Nasal congestion is also the most frequent symptom of AR that significantly affects quality of life and has been considered to contribute to sleep disturbances in patients with AR.[15]

Nasal allergy symptoms are a major burden on patient quality of life and may negatively affect productivity. Therefore, quality-of-life instruments have been developed to measure the effect of AR on patients.[16,17] Generic and disease-specific questionnaires are the two major types of quality-of-life instruments used in population surveys. Generic surveys are broad-based, reproducible measurements that can assess quality of life over all different disease states and conditions, treatment interventions, and population states. The generic

instrument used most often in AR studies is the Medical Outcomes Study 36-Item Short Form Health Survey (SF-36).[18] In contrast, disease-specific instruments are more responsive than generic instruments and allow the researcher to evaluate important aspects of quality relevant solely to the condition studied. The disease-specific instrument used most frequently in AR is the Rhinoconjunctivitis Quality of Life Questionnaire (RQLQ).[19] Meltzer *et al.* have shown that patients with AR had a poorer quality of life, established through both generic (the SF-36) and specific (the Juniper Rhinoconjunctivitis Quality of Life Questionnaire) quality-of-life instruments.[19] Using the SF-36 generic quality-of-life instrument, Bousquet *et al.* compared quality of life in patients with moderate to severe perennial AR with patients with asthma of variable severity[20,21] and reported that patients with AR had a poorer quality of life than patients with asthma in numerous domain measures such as social functioning, energy, mental health, and limitations to both physical and emotional problems.

A major adverse effect of AR is poor nighttime sleep, which may lead to daytime drowsiness, fatigue, and indecision and may also lead to significant impairment in learning and cognitive function.[22–24] In this survey, nasal allergy sufferers reported that their allergies interfered with work and productivity, further indicating that nasal allergy symptoms negatively affect patient quality of life. Furthermore, all healthcare providers recognized that AR has a negative effect on the productivity of their patients who work. Indeed, the mean decrease in total productivity (absenteeism and presenteeism) losses for AR have been reported at $593/employee per year.[25] In 2003, a study using 1996 data estimated the direct costs of AR in the United States at $3.4 billion/year.[26] In another study, which evaluated indirect costs to business as a result of AR, the total work loss was estimated at 3.6 million days, with costs to employers of $445.3 million.[27] Moreover, AR results in an estimated 2 million lost schooldays.[28] A timely management of AR with appropriate therapy may lead to a better quality of life and may improve patient productivity. Because AR is a chronic disease, treatment options should be effective throughout the year, without evidence of tachyphylaxis.

The *Allergies in America* survey indicated that approximately one-third of patients with AR had been previously diagnosed with concomitant asthma. AR frequently precedes asthma and is a risk factor for the development of asthma.[29–31] In support of these results, a recent report by the American Academy of Allergy, Asthma, and Immunology estimated that 38% of patients with AR have asthma, and other studies estimate that 60–78% of patients with asthma have been diagnosed with coexisting AR.[29,32] Notably, patients with asthma and concomitant AR have more severe asthma than patients without AR.[29] Therefore, effective treatment options for the upper airways may decrease the burden of asthma in patients with concomitant AR.

In conclusion, the *Allergies in America* survey establishes that nasal allergy sufferers and healthcare provider perspectives are in concordance with regard to the bothersome symptoms of AR. Effective treatment options for the inflammatory process that results in AR may decrease the burden of bothersome symptoms and comorbidities of AR, thereby improving patient productivity and quality of life.

ACKNOWLEDGMENTS

Editorial assistance was provided by Anoop Padival, Ph.D. (ProEd Communications, Inc., Beachwood, OH).

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