Agency for Healthcare Research and Quality

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Number 67

Management of Allergic Rhinitis in the Working-Age Population

Summary

Overview

Allergic rhinitis affects as many as 35 million people in the United States annually; of these, an estimated 19 million are employed adults. Overall, 10 to 30 percent of adults and up to 40 percent of children are affected, making it the sixth most common chronic illness in the United States. Approximately one-third to one-half of sufferers have seasonal rhinitis, with the remainder experiencing perennial disease or both seasonal and perennial forms of the disease. Other atopic conditions, such as atopic eczema, allergic conjunctivitis, and asthma, often co-occur.

Estimates of the annual direct medical costs of allergic rhinitis in the US range from $1.16 billion to $4.5 billion, rising to $7.7 billion when indirect costs are included. These estimates, however, are based on information that predates the increased use of non-sedating antihistamines and nasal glucocorticoids. Recent prescription claims data show that approximately two-thirds of patients with allergic rhinitis receive treatment with one or more medications from these two drug classes, with expenditures exceeding $3.0 billion for prescription antihistamines alone.

Rhinitis is typically classified etiologically into allergic and non-allergic causes. Non-allergic rhinitis is characterized by chronic nasal symptoms and the lack of identifiable allergic triggers. This report focuses on individuals with allergic rhinitis, including both seasonal and perennial allergic rhinitis. Seasonal allergic rhinitis is associated with sensitization to fungal, tree, grass, and weed pollens, and with symptoms that vary seasonally. Perennial allergic rhinitis is associated with sensitization to indoor allergens such as fungi, cockroaches, dust mites, and animal proteins (e.g., cat dander), and with year-round symptoms, with or without seasonal exacerbations.

The physical symptoms of allergic rhinitis, such as sneezing, rhinorrhea, and nasal congestion, may interfere with one's ability to carry out daily activities. Rhinitis symptoms may be associated with headache, irritability, poor concentration, loss of sleep, and resulting fatigue. The functional impact of these symptoms ranges from mild to seriously debilitating effects on social, physical, and emotional functioning. Allergic rhinitis may interfere with cognitive tasks, may impair work performance, and may cause work absences.

Because allergic rhinitis is so common in the population and allergens are ubiquitous, allergic rhinitis creates a significant burden in the workplace in terms of effects on work performance and health care costs. Although some occupational exposures to airborne allergens present in the workplace can cause occupational rhinitis, non-occupational allergic rhinitis represents a vastly greater burden in workplace settings overall.

The topic of this report was selected by the Agency for Healthcare Research and Quality (AHRQ) in response to a nomination by the American Association of Health Plans. The Duke Evidence-based Practice Center (EPC) conducted the research and developed the final report for AHRQ. The emphasis on the working-age population raises unique issues, including the relationship between symptoms or functional status and work performance, the effects of allergic rhinitis and its treatments on costs and work performance, and variability in management approaches and patient outcomes among patients treated by generalist physicians, allergy specialists, and otolaryngologists.

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The general diagnostic and treatment issues relating to allergic rhinitis were summarized in an earlier evidence report, *Management of Allergic and Nonallergic Rhinitis*, prepared by the EPC at the New England Medical Center. However, the Duke evidence report prioritizes issues not addressed in the New England Medical Center report, including the effect of allergic rhinitis treatment on work performance and costs, and the effectiveness of combinations of pharmacological treatments, immunotherapy, and the use of strict environmental control measures. The Duke research team sought evidence on these issues, evidence that may be valuable not only to employers, policy decisionmakers, and guideline developers, but also to researchers who wish to identify and address gaps in evidence, and to clinicians who care for patients with allergic rhinitis.

Reporting the Evidence

The Duke EPC staff, in consultation with AHRQ and a multidisciplinary panel of experts, refined the key research questions addressed in this report:

1. How do currently available clinical treatments for allergic rhinitis affect costs and work performance?
2. What is the relationship between symptom outcomes or disease-specific quality-of-life measures and work performance among adults with allergic rhinitis? Can data on symptomatic outcome or quality of life be reliably translated into work performance measures?
3. How effective are (a) environmental measures, (b) immunotherapy, and (c) combined treatments, such as antihistamines and nasal steroids or antihistamines and oral decongestants, for relief of symptoms in adults with allergic rhinitis?
4. How do different types of health care providers (generalists, allergy specialists, and otolaryngologists) treat adults with allergic rhinitis, and how do treatment outcomes vary by provider?
5. In adult patients with symptoms of allergic rhinitis, does the prevalence, treatment patterns, or response to treatment vary according to a patient's race or ethnicity?

Methodology

The Duke EPC researchers systematically reviewed the literature for evidence addressing the above questions. They searched for English-language articles indexed in computerized bibliographic databases: MEDLINE®, CINAHL®, the Cochrane Database of Systematic Reviews, the Database of Abstracts of Reviews of Effectiveness, International Pharmaceutical Abstracts, EconLit, and EMBASE. Searches of these databases were supplemented by searching the reference lists of all included articles, especially review articles and meta-analyses, and by scanning current issues of relevant journals not yet indexed in the online databases.

The results of the literature searches were screened by two investigators according to inclusion and exclusion criteria. Empirical studies were included if: (a) the study population had allergic rhinitis; (b) the study provided data on at least one of the five key research questions; and (c) the study met minimal study design criteria for the question being addressed. Minimal study design criteria for the key questions follow:

- Question 1 and 2—Costs and work performance. Any empirical study involving more than 20 patients with allergic rhinitis. Includes randomized controlled trials (RCTs), case series, cohort studies, non-randomized comparison studies, surveys, and secondary data analyses.
- Question 3a—Environmental measures. RCTs and non-randomized prospective cohort comparisons.
- Quesitions 3b and 3c—Immunotherapy and combination drug therapy. RCTs and pseudo-randomized placebo-controlled trials.
- Questions 4 and 5—Clinician specialty differences and racial and ethnic variation. Any empirical study involving more than 20 patients with allergic rhinitis. Includes RCTs, case series, cohort studies, non-randomized comparison studies, surveys, and secondary data analyses.

The full text of each article included at the screening stage was independently reviewed by two investigators. Articles found to meet inclusion criteria were selected for data abstraction. The EPC required patient-assessed symptom outcomes for efficacy questions, and researchers also reported quality of life, functional status, adverse events, and patient global assessments for these questions. For all questions, they recorded work performance and cost outcomes.

The EPC's senior writer/editor began the data abstraction process with a partial abstraction, which included a description of the study design, intervention, number of subjects at the start of the study, and types of outcome data collected. One investigator then completed abstraction of details of the study population, results, and comments; a second investigator over-read the table for completeness and accuracy and performed quality scoring. They evaluated each article included in the evidence tables for methodological quality, grading the level of evidence and describing 13 factors affecting internal or external validity.

The EPC employed quality-monitoring checks at every phase of the literature search, review, and data abstraction process to reduce bias, enhance consistency, and check the accuracy of screening.

Findings

Costs and Work Performance

Few studies assess the impact of the treatment of allergic rhinitis on costs or work performance. The cost-effectiveness literature for allergic rhinitis is small in quantity and suffers from several methodological shortcomings, principally the lack

of a standardized measure of effectiveness, the lack of prospectively collected cost or resource utilization data, and extrapolation of effectiveness data based on short-term randomized trials to long-term economic analyses.

The effects of allergic rhinitis on productivity have been studied by two approaches: by querying workers for a subjective estimate of impairment and by direct objective measurements of worker output. According to one standardized and validated instrument, overall work impairment associated with allergic rhinitis measured subjectively in three studies ranged from approximately 33 to 41 percent. Conversely, two studies using direct measurement found productivity changes ranged from a 10 percent decrease to a 5 percent increase. The discrepancy between methods and studies suggests that the level of impairment due to allergic rhinitis reported by workers may overestimate objectively measured percent reduction in productivity. This finding calls into question the indirect cost estimates from the burden-of-illness studies of allergic rhinitis, all of which used impairment estimates of around 25 percent.

Few data are available on the association between allergic rhinitis symptoms and work performance. A single study reported a moderate correlation between symptom improvement and change in work performance (as measured by a subjective validated instrument). Thus, although it is reasonable to conclude that treatments that improve symptoms while minimizing side effects will likely improve work performance, the increment in productivity would be difficult to estimate from symptom change data.

Environmental Measures

Studies of air filtration systems do not show strong evidence for decreasing rhinitis symptoms; however, studies were likely underpowered to detect clinically relevant differences. A few trials in highly selected patients suggest that dust mite control measures such as an acaricide, impervious covers, and extra house cleaning may decrease rhinitis symptoms. Studies of mite-sensitive asthmatics do not demonstrate any overall clinical benefit of a variety of measures designed to reduce mite exposure.

Immunotherapy

Nearly all of 60 clinical trials of immunotherapy in allergic rhinitis reported symptom outcomes favoring injection immunotherapy over placebo. While this effect was more certain for seasonal allergic rhinitis treated with seasonal allergens, the response among the few studies of perennial rhinitis was similar. No serious adverse events were reported, and immunotherapy was generally well tolerated. Primary quality concerns related to small trial size, lack of standardized clinical outcome assessments, and trial design issues related to randomization procedures and concealment of allocation.

Combined Treatments

Combination symptomatic pharmacotherapy with antihistamines plus decongestants has been well studied and overall shows greater improvement in total and nasal symptoms than monotherapy with either antihistamines or decongestants alone. Combination treatment with antihistamines plus nasal glucocorticoids shows greater improvement in nasal symptoms than antihistamines alone, but no difference when compared to monotherapy with nasal glucocorticoids. Other combinations have been studied in a small number of trials and overall show that, compared with antihistamines alone, the addition of:
(a) ipratropium is beneficial for rhinorrhea symptoms;
(b) ophthalmic antihistamine reduces eye itching; and
(c) the mast cell stabilizer, nedocromil sodium, or a nonsteroidal anti-inflammatory drug improves overall rhinitis symptoms.

Clinician Specialty Differences

Although differences in care and outcomes have been demonstrated between generalist and specialist care in other conditions, including asthma, few data are available in allergic rhinitis. Two studies suggested that clinician-delivered patient education interventions coupled with medical treatment may improve allergic rhinitis symptoms more than medical treatment alone. Several studies point to less-than-adequate knowledge regarding allergy treatment among patients in general medical practice. Although survey data suggest that many patients are referred from generalist practices to specialist clinicians based on the severity of symptoms, there are no published empirical data to support the view that specialist clinicians see more severely affected patients.

Racial and Ethnic Variation

There are few studies addressing any aspect of racial variation in relation to prevalence, treatment patterns, or response to treatment for patients with allergic rhinitis. The largest and most representative study, The National Health and Nutrition Examination Survey, 1976-80, did not show a consistent relationship between allergic rhinitis prevalence and race. Among the randomized trials reviewed for other questions addressed in this literature synthesis, only 11 percent described the racial characteristics of the study population. The only data on variation in treatment patterns with respect to race or ethnicity suggested that in a pediatric population, whites were more likely to continue injection immunotherapy treatment than non-whites. No data exist describing variation in treatment outcomes by race.

Future Research

The EPC assessment of the current evidence suggests that the following issues should be addressed in future research.

Updated estimates of the cost of allergic rhinitis could become more accurate by:

- Estimating indirect costs using valid objective measures of productivity changes.
- Including over-the-counter medications in direct medical costs.
- Accounting for increased use of non-sedating antihistamines and nasal corticosteroids.
- Carefully defining allergic rhinitis, particularly when using administrative data sets.

Although environmental control measures are strongly endorsed by experts, studies of such interventions have been equivocal. More comprehensive environmental control measures, such as those recommended in the National Heart, Lung, and Blood Institute's *Practical Guide for the Diagnosis and Management of Asthma* should be tested in patients with allergic rhinitis and significant functional impairment. If comprehensive interventions prove effective, then future studies should identify critical components.

To better understand the role of immunotherapy in the treatment of allergic rhinitis, we need trials employing vaccines with most or all of the relevant allergens for each individual to assess immunotherapy as it is administered in most community settings. Additional future research objectives should focus on the following:

- Methods to identify patients likely to benefit from immunotherapy.
- Determination of whether immunotherapy alters the natural history of allergic rhinitis and reduces possible sequelae such as bacterial sinusitis and asthma.
- Comparisons of immunotherapy and the best available medical management and/or allergen avoidance.
- Clarifying the optimal duration of immunotherapy.

Certain combination pharmacologic treatments have been shown to be effective in relatively short-term trials, mostly in seasonal allergic rhinitis. Additional data are needed on:

- The effectiveness of combination treatment in perennial allergic rhinitis.
- Longer duration treatment in primary care populations with clinically diagnosed seasonal or perennial allergic rhinitis.
- Effectiveness trials that include outcomes such as health-related quality of life and cost-effectiveness.
- The effectiveness of combinations including mast cell stabilizers, ipratropium, and newer drugs such as leukotriene antagonists.

To understand the quality of current patient care by different clinical specialists, we need:

- Studies describing current practice patterns.
- Prospective studies that compare symptomatic treatment to allergen identification with specific treatment, two approaches commonly used in generalist and specialty practices.
- Observational studies that compare treatment patterns and outcomes across specialties that provide case-mix adjustment. (A standardized and validated severity-of-illness scale would facilitate this research.)

Finally, the research team did not identify any studies that described racial or ethnic differences in treatment patterns or treatment response, in part because study populations were often incompletely described. Future studies should provide more complete descriptions of patient populations, including racial and ethnic descriptors that might allow subgroup analyses to assess racial or ethnic differences in treatment or response.

Availability of Full Report

The full evidence report from which this summary was taken was prepared for AHRQ by the Duke Evidence-based Practice Center under contract number 290-97-0014. It is expected to be available in early 2003. At that time, printed copies may be obtained free of charge from the AHRQ Publications Clearinghouse by calling 800-358-9295. Requestors should ask for Evidence Report/Technology Assessment No. 67, *Management of Allergic Rhinitis in the Working-Age Population.* When available, Internet users will be able to access the report online through AHRQ's Web site at: www.ahrq.gov.

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