Original Article

Impact of Rhinitis on Work Productivity: A Systematic Review

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What is already known about this topic? Information on the economic impact of allergic rhinitis on work productivity remains fragmented and therefore cannot be taken efficiently into account by the medical community and policy makers.

What does this article add to our knowledge? This systematic review confirms that rhinitis impacts at-work productivity more than absenteeism and provides a summary estimate that may serve as guidance for physicians and public health interventions.

How does this study impact current management guidelines? Physicians should draw more attention to the burden of allergic rhinitis on work productivity, and inform the patient of the possible occupational impacts of the condition and the benefits of treatment.

BACKGROUND: Allergic rhinitis (AR) is increasingly acknowledged as having a substantial socioeconomic impact associated with impaired work productivity, although available information remains fragmented.

OBJECTIVE: This systematic review summarizes recently available information to provide a quantitative estimate of the burden of AR on work productivity including lost work time (ie, absenteeism) and reduced performance while working (ie, presenteeism).

METHODS: A Medline search retrieved original studies from 2005 to 2015 pertaining to the impact of AR on work productivity. A pooled analysis of results was carried out with studies reporting data collected through the validated Work Productivity and Activity Impairment (WPAI) questionnaire.

RESULTS: The search identified 19 observational surveys and 9 interventional studies. Six studies reported economic evaluations. Pooled analysis of WPAI-based studies found an estimated 3.6% (95% confidence interval [CI], 2.4; 4.8%) missed work time and 35.9% (95% CI, 29.7; 42.1%) had impairment in at-work performance due to AR. Economic evaluations indicated that indirect costs associated with lost work productivity are the principal contributor to the total AR costs and result mainly from impaired

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Abbreviations used
AR- Allergic rhinitis
ARIA- Allergic Rhinitis and its Impact on Asthma
CI- Confidence interval
COPD- Chronic obstructive pulmonary disease
IQR- Interquartile range
RCT- Randomized controlled trial
SD- Standard deviation
SE- Standard error
SPS- Stanford Presenteeism Scale
SR- Systematic review
WPAI-AS- Work Productivity and Activity Impairment questionnaire-Allergy Specific

presenteeism. The severity of AR symptoms was the most consistent disease-related factor associated with a greater impact of AR on work productivity, although ocular symptoms and sleep disturbances may independently affect work productivity. Overall, the pharmacologic treatment of AR showed a beneficial effect on work productivity.
CONCLUSIONS: This systematic review provides summary estimates of the magnitude of work productivity impairment due to AR and identifies its main determinant factors. This information may help guide both clinicians and health policy makers. **(J Allergy Clin Immunol Pract 2017;■:■-■)**

Key words: *Absenteeism; Allergy; Rhinitis; Work productivity; Presenteeism*

Allergic rhinitis (AR) is a global public health issue due to its high prevalence and its adverse impacts on sleep, cognitive functioning, mood, and associated comorbid conditions, such as asthma and sinusitis, and ultimately on quality of life and work and school performance.[1-3]

A number of reviews have highlighted the socioeconomic burden of AR in terms of impaired work productivity, including lost work time (ie, absenteeism) and reduced performance while working (ie, impaired presenteeism).[4-8] Blanc et al[9] first reported that reduction in self-rated job effectiveness was more common in individuals with rhinitis (36%) than among those with asthma (19%), whereas absenteeism was similar in both conditions. US population-based surveys have provided estimates of the annual number of workdays missed because of AR ranging from 0.03 to 0.8 per employed individual.[10-13] Goetzel et al[14] combined data on work productivity impairment from 3 large-scale US surveys and concluded that "allergy" (excluding asthma) was associated with an average 3.4% (range: 0.3% to 9.0%) productivity loss due to work absence and an average 10.9% (range: 8.3% to 14.5%) reduction in at-work performance. Even though an increasing number of studies of AR have included quantitative and validated measures of absenteeism and presenteeism,[15] to our knowledge, no systematic review (SR) of this area has yet been conducted. Therefore, available information on the impact of AR on work productivity remains fragmented and cannot be efficiently taken into account to guide clinical practice and public health interventions.

This SR aimed to synthesize and critically analyze the available information pertaining to the burden of AR on work productivity both in terms of absenteeism and impaired presenteeism to derive summary quantitative estimates of these effects. The secondary aim of this SR was to identify the factors that may affect, either negatively or positively, these productivity impairments.

METHODS

Protocol

This SR was conducted according to the Preferred Reporting Items for Systematic reviews and Meta-Analyses (www.prisma-statement.org).[16]

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Conflicts of interest: D. Price (all fees paid to Observational and Pragmatic Research Institute) is a board member for Aerocrine, Amgen, AstraZeneca, Boehringer Ingelheim, Chiesi, Meda, Mundipharma, Napp, Novartis, and Teva Pharmaceuticals; has received consultancy fees from Almirall, Amgen, AstraZeneca, Boehringer Ingelheim, Chiesi, GlaxoSmithKline, Meda, Mundipharma, Napp, Novartis, Pfizer, Teva Pharmaceuticals, and Theravance; has received research support from UK National Health Service, British Lung Foundation, Aerocrine, AKL Ltd, AstraZeneca, Boehringer Ingelheim, Chiesi, Meda, Mundipharma, Napp, Novartis, Pfizer, Respiratory Effectiveness Group, Takeda, Teva Pharmaceuticals, Zentiva, and Theravance; has received lecture fees from Almirall, AstraZeneca, Boehringer Ingelheim, Chiesi, Cipla, GlaxoSmithKline, Kyorin, Meda, Merck, Mundipharma, Novartis, Pfizer, Skyepharma, Takeda, and Teva Pharmaceuticals; has received fees for manuscript preparation from Mundipharma and Teva Pharmaceuticals; has received travel support from Aerocrine, Boehringer Ingelheim, Mundipharma, Napp, Novartis, Teva Pharmaceuticals, and AstraZeneca; has received payment for patient enrollment or completion of research from Chiesi, Teva Pharmaceuticals, Zentiva, and Novartis; has received payment for developing educational materials from Novartis and Mundipharma; has stock/stock options from AKL Ltd which produces phytopharmaceuticals; and owns 74% of the social enterprise Optimum Patient Care Ltd, UK, and 74% of Observational and Pragmatic Research Institute Pte Ltd, Singapore. A. L. Valero has received consultancy fees from FAES, Orion Pharma, Novartis, Sanofi, Stallergenes, Meda, GlaxoSmithKline, Chiesi, AstraZeneca, Zambon Esteve, Uriach, and VIFOR; and has received research support from Novartis, Leti, Uriach, and Meda. J. Bousquet has received personal fees for being on the scientific and advisory board for Almirall, Meda, Merck, MSD, Novartis, Sanofi-Aventis, Takeda, Teva, and Uriach; and has received lecture fees from Almirall, AstraZeneca, Chiesi, GSK, Meda, Menarini, Merck, MSD, Novartis, Sanofi-Aventis, Takeda, Teva, and Uriach. The rest of the authors declare that they have no relevant conflicts of interest.

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