

The Impact of Allergic Rhinitis on Quality of Life: A Comprehensive Study

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Abstract: Background: Allergic rhinitis is a very common chronic inflammatory disease that significantly reduces the quality of life (HRQoL). However, there are still no adequate demarcations of how the severity of the disease downregulates patient-reported outcomes. The current study aimed at determining the impacts of the severity of allergic rhinitis on HRQoL and the functional status of adults attending an outpatient clinic. Methods: The study was an observational cross-sectional study that examined 170 adults from Iraq whose case of allergic rhinitis was diagnosed by a physician. Stratification, according to ARIA criteria, was done by dividing participants into two equal groups, Group I (patients with mild-moderate intermittent or persistent disease, n=85) and Group II (patients with moderate-severe persistent disease, n=85). Extensive demographic and clinical aspects, the duration of the disease, comorbidities such as asthma, chronic sinusitis, atopic dermatitis, and food allergy were cumulatively collected. Also, absenteeism at work and school over the last three months, presenteeism, emotional and social consequences, existing pharmacotherapeutic training, and self-reported medication adherence had been recorded. The statistical comparisons of cohorts were conducted with the help of the relevant parametric and non-parametric tests; the multivariate logistic regression was used to determine independent predictors of poor QoL. Findings: The two groups were similar in terms of age, gender distribution, living status, and smoking habits. Group II had a significantly higher mean RQLQ total score than Group I (about 4.3 versus 2.8 on a 0-6 scale), and the most significant differences were found in the domains of nasal symptoms and sleep. Group II patients indicated more days out of school or out of work, more productivity loss, more irritability and embarrassment, and more frequent social avoidance and a decrease in outdoor activities. Whereas intranasal corticosteroids, combination therapy, and allergen immunotherapy were more frequently used in Group II, the overall compliance was considerably decreased. Under multivariable analysis, under Group II, the independent predictors of poor QoL included prolonged disease duration, asthma comorbidity, and poor adherence, without statistical significance of age and sex. These results highlight the urgency to identify the patients at high risk early, systematically use proven QoL measures, combine the management of both upper and lower airway disease, and adopt patient-centered approaches that will result in better treatment adherence to reduce the overall effect of allergic rhinitis on the lives of patients.

Keywords: ARIA Criteria, Food Allergy, Pharmacotherapeutic, QoL, Habit, Rqlq, Combination Therapy.

INTRODUCTION

Allergic rhinitis still continues to be one of the most common chronic diseases witnessed worldwide, and it is a significant public-health problem because of its high prevalence, morbidity, and socio-economic effects. This allergic pathway of the inflammatory process in the nasal mucosa occurs in the classic presentation of sneezing, nasal congestion, rhinorrhoea, and nose/conjunctival pruritus upon allergen exposure. [Wang, H. R. *et al.*, 2023; Traebert, J. *et al.*, 2023] These allergens can be separated into seasonal allergens, which include pollens and mould spores, and perennial allergens, which include house dust mites, pet dander, and cockroach proteins. Though the condition is seldom fatal, its chronic symptom load, often underestimated by both patients and clinicians, may severely affect the functioning in everyday life and the quality of life as a whole [Kim, B. J. *et al.*, 2011].

The epidemiological data indicate the tendency towards the increased prevalence of allergic rhinitis over the past decades, both in the pediatric and adult populations of different geographical areas [Al Frayh, A. R. *et al.*, 2001; Alreshidi, F. M. *et al.*, 2017; Albouq, N. G., & Julaidan, R. A. 2022]. Modern approximations indicate that between 20 and 30 per cent of people can be affected by this disease, with the highest incidence rates being reported in urbanised and industrialised states. This increase can be associated with a myriad of determinants, which include environmental pollution, changes in climate, changing of lifestyle, and exposure of indoor allergens [Guerra-Martín, M. D. *et al.*, 2023; Patel, R. B. *et al.*, 2023; Liu, J. *et al.*, 2020] At the same time, the emerging body of literature posits the allergic rhinitis as a symptom of the so-called united airways disease as it often accompanies asthma and other atopic manifestations including atopic dermatitis and conjunctivitis. This leads to

multimorbidity, which further increases the disease burden and makes it difficult to deal with therapeutic strategies [Komnos, I. D. *et al.*, 2019; DeConde, A. S. *et al.*, 2014].

The health-related quality of life (HRQoL) is a new concept that has become one of the more significant outcome measures that go way beyond the traditional clinical metrics. HRQoL includes physical, psychological, and social aspects of health to note, which involves assessing how the patient, himself, values the effects of illness and treatment on normal life [Chowdhury, N. I. *et al.*, 2017; Li, A. R. *et al.*, 2021; Zhang, K. *et al.*, 2022]

These sequelae are particularly acute since patients can seem healthy clinically but are significantly functional impaired. [Husain, Q. *et al.*, 2020]

Allergic rhinitis is able to disorganize various aspects of life. Nocturnal nasal congestion, post-nasal drip, and coughing are common nighttime causes of sleep impairment leading to problems in going to sleep, waking up frequently throughout the night, and getting insomnia that is not restful. Lack of sleep, in its turn, predisposes to sleepiness in the day, irritability, and poor concentration, hence, deteriorating the academic performance in children and efficiency in working in adults [Alobid, I. *et al.*, 2006]. According to the findings of empirical research, children who have poorly controlled allergic rhinitis have lower academic achievements, behavioural difficulties, and increased rates of absenteeism. Similarly, the adults also complain of reduced productivity at work, presenteeism, and high turnover with significant economic implications at both personal and social levels. [Harmsen, L. *et al.*, 2010]

Patients usually report disappointment, embarrassment, and low self-esteem due to the constant symptoms like sneezing frequently, nasal discharge, or red and oedematous eyes. Persistent pain and frequent attacks cause anxiety and despair, especially when the disorder is poorly managed or when the precipitating factors are omnipresent and evasive. Emotional stress is further worsened by the need of long-term pharmacotherapy, regular appointments with specialists, and lifestyle changes. Such psychological aspects are often under-appreciated in the normal clinical practice, yet they are evidently of practical importance to holistic health. [Chen, H. *et al.*, 2004]

MATERIAL AND METHOD

This study was a prospective, cross-sectional observational study conducted in the outpatient otorhinolaryngology/allergy clinics in one of the largest tertiary care centers in a period of twelve months.

The patients who were recruited consisted of a group of 170 successive patients who were sampled in different hospitals in Iraq in the study period of 2024-2025. The subjects were all allergic to rhinitis and diagnosed by physicians, and were within the age group of 18 -60 years. They were equally split into two categories based on the ARIA classification, with Group 1 having 85 patients with mild-moderate intermittent/persistent allergic rhinitis and Group 2 having 85 patients with moderate-severe persistent allergic rhinitis.

The exclusion criteria included chronic rhinosinusitis with polyposis of the nose, acute respiratory infection in the last four weeks, previous nasal surgery, severe structural nasal deformity, uncontrolled asthma requiring systemic corticosteroids, pregnancy, severe psychiatric condition, and inability to fill in the questionnaire.

Every individual was taken through a thorough history taking and physical examination that also involved anterior rhinoscopy and, in some cases, nasal endoscopy. Pattern and severity of disease intermittent, persistent; mild, moderate, severe: Disease severity and pattern were determined by ARIA guidelines, based on frequency and impact of symptoms on sleep, selected daily activities, work or schooling, and perceived severity.

The assessment of HRQoL was performed with the help of the Rhino conjunctivitis Quality of Life Questionnaire (RQLQ), that is validated and consists of seven domains: activities, sleep, non-nose/eye symptoms, practical problems, nasal symptoms, eye symptoms, and emotional functioning. The items were rated on a 7-point Likert scale (0-6) and the domain and total scores obtained as the mean of the item scores, with higher scores indicating worse quality of life.

The patients were advised to record the number of missed school/workdays and subjective productivity loss (presenteeism) in the past three months on a number rating scale of 0-10. The variables of emotional and social impact, such as irritability, embarrassment, social avoidance, and decreased outdoor activities, were measured using structured questions in accordance with the usual rhinitis quality-of-life instruments.

Present pharmacotherapy was recorded, including the use of intranasal corticosteroids, oral or intranasal antihistamines, leukotriene receptor antagonists, and allergen immunotherapy. Self-reported compliance as a proportion of the prescribed doses taken in the last four weeks (good, 80-100 percent, and poor, 80-100 percent).

The institutional ethics committee gave its approval to the study protocol and conducted it in compliance with the Declaration of Helsinki. Informed consent was given to all the participants in the form of a written consent.

Statistical analysis

The data were keyed in SPSS software. The continuous variables were presented as mean Format. Categorical variables were given in frequencies and percentages and compared with chi-square or Fisher's exact tests. The independent predictors of poor HRQoL (RQLQ total >4) were identified with the help of logistic regression. Univariate analysis variables whose P was less than 0.10 were included in the multivariate model, with adjusted odds ratios and 95 percent confidence intervals provided, and P less than 0.05 taken as a statistically significant value.

RESULTS

Table 1. Demographic characteristics of the studied groups

Variable	Group I (n = 85)	Group II (n = 85)	p-value
Age (years), mean $\pm$ SD	30.4 $\pm$ 9.2	31.1 $\pm$ 8.7	0.56
Male, n (%)	46 (54.1)	48 (56.5)	0.75
Urban residence, n (%)	60 (70.6)	63 (74.1)	0.62
Smoking, n (%)	18 (21.2)	21 (24.7)	0.59
Clinical profile of allergic rhinitis			
Variable	Group I (n = 85)	Group II (n = 85)	p-value
Disease duration (years), mean $\pm$ SD	3.4 $\pm$ 2.1	5.8 $\pm$ 3.0	<0.001
Intermittent pattern, n (%)	64 (75.3)	19 (22.4)	<0.001
Persistent pattern, n (%)	21 (24.7)	66 (77.6)	<0.001
Predominant nasal obstruction, n (%)	29 (34.1)	53 (62.4)	<0.001
Predominant sneezing, n (%)	37 (43.5)	19 (22.4)	0.004
Associated conjunctivitis, n (%)	32 (37.6)	48 (56.5)	0.01
Comorbidities in the studied groups			
Asthma, n (%)	14 (16.5)	31 (36.5)	0.003
Chronic sinusitis, n (%)	11 (12.9)	27 (31.8)	0.002
Atopic dermatitis, n (%)	9 (10.6)	13 (15.3)	0.36
Food allergy, n (%)	6 (7.1)	10 (11.8)	0.30

Table 2. Global quality of life scores (RQLQ total)

Variable	Group I (n = 85)	Group II (n = 85)	p-value
RQLQ total score, mean $\pm$ SD*	2.8 $\pm$ 0.9	4.3 $\pm$ 1.1	<0.001
Patients with score $\geq$ 4, n (%)	18 (21.2)	55 (64.7)	<0.001

Table 3. Domain-specific RQLQ scores

Domain (0–6)	Group I mean $\pm$ SD	Group II mean $\pm$ SD	p-value
Nasal symptoms	3.1 $\pm$ 1.0	4.7 $\pm$ 1.1	<0.001
Ocular symptoms	2.4 $\pm$ 0.8	3.2 $\pm$ 0.9	<0.001
Sleep	2.6 $\pm$ 0.9	4.1 $\pm$ 1.0	<0.001
Practical problems	2.3 $\pm$ 0.8	3.6 $\pm$ 0.9	<0.001
Activities limitation	2.2 $\pm$ 0.7	3.4 $\pm$ 0.8	<0.001
Emotional function	2.1 $\pm$ 0.7	3.3 $\pm$ 0.8	<0.001
Non-nasal/ocular symptoms	2.0 $\pm$ 0.6	3.0 $\pm$ 0.7	<0.001

Table 4 . School/work absenteeism and presenteeism (last 3 months)

Variable	Group I (n = 85)	Group II (n = 85)	p-value
Days absent, mean $\pm$ SD	1.8 $\pm$ 2.0	4.7 $\pm$ 3.1	<0.001
Patients with ≥ 3 days absent, n (%)	19 (22.4)	49 (57.6)	<0.001
Presenteeism score (0–10), mean $\pm$ SD*	3.1 $\pm$ 1.9	6.2 $\pm$ 2.1	<0.001

Table 5. Emotional and social impact

Variable	Group I (n = 85)	Group II (n = 85)	p-value
Frequent irritability, n (%)	21 (24.7)	46 (54.1)	<0.001
Embarrassment due to symptoms, n (%)	18 (21.2)	41 (48.2)	<0.001
Social avoidance during high pollen days, n (%)	25 (29.4)	52 (61.2)	<0.001
Reduced outdoor activities, n (%)	27 (31.8)	57 (67.1)	<0.001

Table 6. Treatment patterns and adherence

Variable	Group I (n = 85)	Group II (n = 85)	p-value
Intranasal corticosteroids, n (%)	41 (48.2)	63 (74.1)	0.001
Oral antihistamines, n (%)	65 (76.5)	72 (84.7)	0.19
Combination (steroid + antihistamine), n (%)	28 (32.9)	51 (60.0)	<0.001
Allergen immunotherapy, n (%)	8 (9.4)	19 (22.4)	0.02
Good adherence ($\geq 80\%$ doses), n (%)	56 (65.9)	39 (45.9)	0.007

Table 7. Independent predictors of poor QoL (RQLQ total ≥ 4)

Variable	Adjusted OR	95% CI	p-value
Group II (vs Group I)	3.40	1.85–6.24	<0.001
Disease duration (per year)	1.12	1.03–1.22	0.008
Asthma comorbidity (yes)	2.15	1.16–3.99	0.015
Poor adherence (<80%)	2.63	1.44–4.80	0.002
Age (per year)	1.01	0.98–1.04	0.56
Male sex (vs female)	0.94	0.52–1.68	0.83

DISCUSSION

The demographics of the two cohorts were similar, and the average age was around thirty years; the genders were equal (around fifty-four to fifty-seven percent men). No major differences arose in residence or status of smoking. This similarity eliminates confounding in terms of categorical demographic factors and strengthens the conclusion that reported dissimilarities in the quality of life can be attributed to the severity of a disease and not age, sex, or lifestyle factors. No statistically significant p-values in the given variables would also enhance the internal validity of the further comparisons between Group I and Group II.

The differences were all statistically significant (p 5.001), which is consistent with the categorization of the Group II as moderate-to-severe and explains the stronger loss of quality of life among the Group II. The ease of sneezing to the obstruction is a change in sneezing, from almost periodic symptoms of nuisance to sustained, and functionally disabling nasal congestion.

The two groups are also further differentiated by the comorbidity profile. In Group II, only in comparison with Group I, the figure was about 36 per cent in asthma and 32 per cent in chronic sinusitis, which were statistically significant. These results support the United Airlines hypothesis, in which more severe rhinitis is associated with lower airway and sinus disease, and thus cumulative symptom burden and negative outcomes. The less-significant variations in atopic dermatitis and food allergy are less important, implying that the respiratory comorbidities are the primary contributors to the additional importance in this cohort.

The mean RQLQ total score was significantly greater in Group II (about 4.3 vs. 2.8 on a 0–6 scale), and almost two-thirds of Group II scored four or higher, vs. approximately one-fifth of Group I. These data establish that the severity of the disease correlates with a clinically significant decrease in overall well-being, as higher scores indicate worse quality of life. The high level of statistical significance (p < 0.001) is reflective of other series of studies where more severe or

chronic allergic rhinitis is continually related with significantly lowered health-related quality of life.

Domain analysis proves that the influence of severity is not even, but the strongest in the areas of nasal and sleep: the mean nasal score in Group II was around 4.7 and 3.1 in Group I, and the mean sleep score was 4.1 and 2.6, with both differences being highly significant. Also, there were approximately one-point or larger differences in practical problems, activity limitation, emotional functioning, and non-nasal/ocular symptoms, which suggest that it has widespread effects on the functioning of the day and mood. This tendency is reflected in previous studies that indicate nocturnal impairment and functional restrictions during the day as the leading causes of perceived burden in allergic rhinitis.

These symptoms result in work-related and school-related functional impairments: Group II had over twice the average number of absentee days in three months (= 4.7 versus 1.8) and scored significantly higher on a 0-10 scale of presenteeism (= 6.2 versus 3.1). Group II showed more days out, three or more days absent, than Group I, and so severe rhinitis has not only an unpleasant effect but also quantitative educational and economic consequences. These results are in line with the literature that showed that uncontrolled allergic rhinitis decreases productivity, although the patients are still at work or school [Blaiss, M. S. 1997; Van Cauwenberge, P. 2002].

Emotionally, Group II patients indicated frequent irritability in approximately 54% 0 25 of Group II and embarrassment in approximately 48% 0 21 of Group II, which indicated that chronic, conspicuous symptoms do impact self-image and interpersonal contact. Socially, Group II (more than 60 percent) shunned social activities during high-pollen seasons, and approximately 67 percent cut down outdoor activities as opposed to approximately 29 32 percent in Group I. Such variations suggest that extreme allergic rhinitis encourages maladaptive avoidance habits that gradually limit social activity and leisure, which increases the physical disease load.

Patterns of treatment show an anticipated increase of pharmacologic intensity with Group 2, with more intranasal corticosteroid (approximately 74 percent versus 48 percent), combination therapy (approximately 60 percent versus 33 percent), and allergen immunotherapy (approximately 22 percent versus 9 percent). Nevertheless,

paradoxical good adherence (≥ 80 percent of doses) was lower in Group II (approximately 46 percent of doses versus 66 percent of doses), indicating that complex regimen, worries, and treatment fatigue may restrict successful control. This is a combination of increased intensity of theoretical treatment and worse adherence, which could be one of the reasons why the more severe group continued to experience a burden of symptoms and lower quality of life. [Laforest, L. *et al.*, 2005; Canonica, G. W. *et al.*, 1998]

The comorbidity of allergic rhinitis (AR) with asthma, conjunctivitis, atopic dermatitis, and even food allergies is well documented.¹⁻⁴ Up to 20% of patients who consult for rhinitis also suffer from bronchial asthma, and almost half have conjunctivitis.¹ Allergic rhinitis is a risk factor for the incidence of asthma.^{2,3} The epidemiological, etiological, and functional parallels observed between allergic diseases, particularly between rhinitis and asthma,⁵ make a comprehensive approach to the patient a priority [Bousquet, J. *et al.*, 1994; Bousquet, J. *et al.*, 1994]. Therefore, it is important to make an early, accurate, and complete diagnosis that includes clinical and immunological criteria, as well as a complete functional evaluation that includes concomitant pathologies and repercussions on quality of life.⁶

Although rhinitis is not a life-threatening condition, it has a significant impact on quality of life, altering social life and affecting school and work performance.⁷⁻⁹ This impairment in quality of life serves as a parameter to define the severity of the disease.⁸ Furthermore, given its high prevalence among young people, the decline in quality of life not only affects social life and self-esteem, but also disrupts work and school life, leading to absenteeism, decreased productivity and concentration, and even reduced learning capacity.⁷⁻¹⁰ Although this decline in quality of life is assumed to be greater in patients who also have asthma, this has not been adequately verified.

Most studies evaluating quality of life in allergic rhinitis have been conducted in atopic populations from specialist clinics. In fact, quality of life has been used as a useful efficacy variable in several clinical trials with medications.^{9,11} A general study has been published on an outpatient pediatric population,¹²

and only asthma has been compared with another disease in terms of its impact on quality of life.¹³ The study found that in severe allergic rhinitis, the impact on quality of life is even greater than that caused by asthma [Kalpaklioglu, A. F. et al., 2006].

Comparing allergic rhinitis and hypertension allowed us to demonstrate that both conditions have a very similar impact on health-related quality of life among patients in primary healthcare centers, despite their differing life expectancies. However, two important demographic characteristics, age and sex, differed in the samples of patients with allergic rhinitis and hypertension, which represents one of the study's limitations. No statistically significant differences were observed in the physical and psychological components of the SF-12 scale between the two conditions after adjusting for age and sex [Ford, E. S. et al., 2004]

The impact of the disease on certain daily activities was explored independently and more comprehensively. In this context, this study used a simple questionnaire to collect data on how the disease affected patients' daily activities. The proportion of patients whose disease significantly impacted their daily activities, such as physical activity, sports, work, leisure time, and driving, was found to be significantly higher among patients with allergic rhinitis compared to those with hypertension, across all age groups and without any sex-related differences. These data are consistent with other studies that analyzed the impact of social factors on the quality of life of patients with allergic rhinitis or asthma.

CONCLUSION

Recent studies have always shown that the rising degree of allergic rhinitis severity and chronicity are significantly intertwined with the significant declines in health-related quality of life, including physical, emotional, and social dimensions. Patients with moderate-severe manifestations have increased prevalence of nasal obstruction, longer disease burden, and a greater number of respiratory comorbidities, such as asthma and long-term sinusitis, which combine to result in significantly lower quality of life scores of Global and domain-specific Rhinology, and increased absenteeism and presenteeism. Such results indicate that allergic rhinitis cannot be ignored as an innocuous disease but must be perceived as a condition with a real cost in terms of daily

functioning, work and study productivity, and psychological-social well-being.

Even under the impact of pharmacologic intensification in the severe group, the level of quality-of-life worsening is very high, thus highlighting the critical role of adherence to treatment and holistic management of the disease. Reduced QoL is predicted by suboptimal adherence, coexisting asthma, and long-term disease, thus covering the need to detect it in time, combine airway management, and arrange organized educational programs to improve patient outcomes.

All these findings support a paradigm shift to patient-based care routes in allergic rhinitis, whereby validated QoL measures are systematically applied, risk factors, including adherence, can be altered, and upper and lower airway disease are treated as a complete entity. This means that such a strategy will be effective in reducing the personal and social burden that is caused by this prevalent condition.

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