

Assessment of Health-Related Quality of Life in Allergic Rhinitis Patients Using Questionnaire-Based Tools (SFAR & WHOQOL): A Tertiary Care Hospital-Based Study

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Abstract

Background: AR is a prevalent, long-term inflammatory disease of the nasal mucosa that strongly influences physical, psychological, and social well-being. Although AR is a prevalent condition with a high incidence, its effects on health-related quality of life (HRQL) are not a priority in daily clinical practice. Validated questionnaire-based assessment tools can provide a complete picture of disease burden that is not based solely on symptom severity. **Material and Methods:** A hospital-based cross-sectional observational study was conducted among 215 adult patients with symptoms suggestive of allergic rhinitis attending the ENT outpatient department. Diagnosis was established using the SFAR questionnaire (cut-off ≥ 7). HRQL was assessed using the WHOQOL-BREF, which assesses four domains: physical health, psychological health, social relationships, and environment. Data were analyzed using non-parametric statistical methods. The Mann-Whitney U test was used for group comparisons, and Spearman correlation was applied to assess the relationship between SFAR scores and quality-of-life domains. **Results:** The mean age of participants was 25.37 ± 5.81 years, with nearly equal gender distribution. The mean SFAR score was 11.61 ± 1.89 , indicating moderate disease severity. WHOQOL-BREF scores demonstrated reduced quality of life across all domains, with the greatest impairment in the physical (9.14 ± 2.63) and psychological (8.20 ± 2.55) domains, followed by the environmental (10.64 ± 3.33) and social (4.78 ± 1.07) domains. A statistically significant negative correlation was observed between SFAR score and all QoL domains, including physical ($r = -0.244$), psychological ($r = -0.249$), social ($r = -0.240$), and environmental domains ($r = -0.282$, $p < 0.001$). No significant gender differences were noted ($p > 0.05$). **Conclusion:** Allergic rhinitis significantly impairs health-related quality of life, particularly affecting physical and psychological domains. Increasing disease severity is associated with worsening HRQL. The inclusion of validated instruments such as SFAR and WHOQOL-BREF in everyday clinical practice is necessary to ensure comprehensive assessment and enhance patient-focused management.

Keywords: Allergic rhinitis; Health-related quality of life; SFAR; WHOQOL-BREF; Quality of life; Cross-sectional study; Patient-reported outcomes.

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INTRODUCTION

Allergic rhinitis AR is a persistent immunoglobulin E (IgE) mediated response of the nasal mucosa caused by exposure to environmental allergens. It is diagnosed clinically by sneezing, rhinorrhoea, nasal congestion, and itching, and ocular manifestations frequently accompany it. AR is a significant health issue worldwide, with ARIA guidelines defining it as a duration and severity-based condition, and also noting a high level of correlation with asthma and other atopic conditions.^[1] Such interdependence underscores the clinical and community health importance of allergic rhinitis. The current prevalence rate of allergic rhinitis in the world an estimated prevalence of 10-30 percent of the general population has been revealed to be rising significantly over recent decades. The attribution of rapid urbanization, industrialization, environmental pollution, and lifestyle changes to increased exposure to allergens and irritants is compounding the burden in developing countries like

India.^[2] These epidemiological transformations have contributed to the increase in the incidence of allergic illnesses, especially in young adults and urban residents. Although this prevalence is increasing, allergic rhinitis is not well understood or treated, likely because it is perceived as a less serious or trivial illness. Disease burden in allergic rhinitis does not just assess clinical manifestations but also requires measures of its effects on daily

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functioning and well-being. Health-related quality of life (HRQL) is a multidimensional concept defined by the World Health Organization as encompassing physical health, psychological well-being, social ties, and the environment.^[3] Persistent symptoms in patients with allergic rhinitis often result in sleep disturbances, fatigue, poor concentration, and reduced productivity, with a significant effect on overall quality of life.

Allergic rhinitis represents a significant burden on healthcare and socioeconomic costs worldwide. It influences work output, education, and socialization, lowering functional capacity and increasing indirect costs through absenteeism and presenteeism. According to the World Allergy Organization, the prevalence of allergic rhinitis has been noted as one of the most frequent chronic illnesses in the world, which is accompanied by significant disability in everyday life and quality of living.^[4] Some effects are often underrated in daily clinical practice, leading to poor management. Because of the multidimensional nature of allergic rhinitis, new ARIA recommendations support a hybrid approach that includes assessing symptoms and patient-reported outcomes, especially quality-of-life measures.^[5] On the same note, the Centers for Disease Control and Prevention (CDC) recognizes allergic rhinitis as a major public health concern due to its high prevalence, chronicity, and potential impact on productivity and daily functioning.^[6] The National Institute for Health and Care Excellence (NICE) also recommends using patient-centered evaluation instruments during routine evaluation to shape personalized therapy and enhance long-term outcomes.^[7]

Despite these suggestions, the number of studies evaluating the joint effects of allergic rhinitis on health-related quality of life in Indian tertiary care settings is relatively limited. In clinical assessments, the focus still largely depends on symptom-based measures, which might not accurately reflect the disease burden. Various tools assessing the impact of the disease can be more thoroughly and objectively evaluated using validated questionnaire-based tools.

In this regard, the Score for Allergic Rhinitis (SFAR) is a valid screening instrument for diagnosing allergic rhinitis. In contrast, the WHOQOL-BREF questionnaire is an appropriate standard measure of quality of life across various domains.^[3] The study was thus conducted to evaluate the health-related quality of life of patients with allergic rhinitis using these validated instruments in a tertiary care hospital, thereby filling a significant knowledge gap in the current literature and addressing the need for better patient-centered treatment.

MATERIALS AND METHODS

A cross-sectional observational study was conducted in the Department of Otorhinolaryngology at a tertiary care teaching hospital in Chennai over 2 months. The study included 215 adults from the ENT outpatient department who reported symptoms potentially due to allergic rhinitis. The study included persons aged 18 years or older who were willing to participate and provide informed consent. Those patients with bronchial asthma, chronic rhinosinusitis and nasal polyposis, other chronic respiratory or systemic diseases, and those with acute upper respiratory tract infection were excluded to limit confounding factors in the measurement of quality of life.

Allergic rhinitis screening and diagnosis were done using the Score of Allergic Rhinitis (SFAR) questionnaire. The greater the SFAR score, the more significant the patients' allergic rhinitis was assumed to be, and further analysis was carried out. The health-related quality of life (HRQL) was measured using the World Health Organization Quality of Life-Brief (WHOQOL-BREF) questionnaire, a validated instrument with 26 questions that assesses four domains: physical health, psychological health, social relationships, and environmental factors. Both questionnaires were conducted in the standard way; informed consent was obtained, and confidentiality and participation were maintained. The sociodemographic information (age, gender, and occupation) was collected using a structured data collection pro forma. The calculation of WHOQOL-BREF domain scores was performed using the features of standard scoring. The obtained information was recorded in Microsoft Excel and processed with the right statistical software.

The Shapiro-Wilk test was used to determine whether the data were normally distributed. The data were nonparametric because they were not normally distributed, so nonparametric tests were used. Demographic descriptions and those of questionnaire scores were summarized using descriptive statistics. The scores on the quality-of-life domains were compared between the genders using the Mann-Whitney U test. A Spearman correlation analysis was conducted to determine the association between SFAR scores and WHOQOL-BREF domain scores. The p-value was below 0.05, indicating statistical significance.

RESULTS

The study included 215 participants with a diagnosis of allergic rhinitis based on the SFAR questionnaire. The analysis was conducted based on sociodemographic characteristics, domains of quality of life, gender-based comparisons, and the relationship between quality of life and disease severity.

Table 1: Sociodemographic characteristics of study participants

Variables	Category	Frequency	Percentage
Age (years)	Mean \pm SD	25.37 \pm 5.817	
	Median (IQR)	23.00 (21.00, 29.00)	
Gender	Male	106	49.3
	Female	109	50.7
Occupation	Student	134	62.3
	Doctor	16	7.4
	Business	12	5.6
	Employee	53	24.7
Total		215	100.0

The study population consisted predominantly of young adults, with a mean age of 25.37 years. The gender distribution was nearly equal. The majority of participants

were students (62.3%), indicating a higher burden of allergic rhinitis among younger, active individuals.

Table 2: Descriptive Statistics of SFAR and WHOQOL Domains

Variables	Mean	Standard deviation	Median	IQR (Q1 – Q3)
SFAR score	11.61	1.89	11.0	(10.00 – 13.00)
Physical health	9.14	2.63	7.00	(7.00 – 11.00)
Psychological Function	8.20	2.55	7.00	(6.00 – 10.00)
Social relationship	4.78	1.07	5.00	(5.00 – 5.00)
Environment	10.64	3.33	8.00	(8.00 – 13.00)
Quality of Life	35.29	8.74	30.00	(28.00 – 44.00)

Participants demonstrated moderate SFAR scores, indicating clinically significant allergic rhinitis. Quality-of-life scores were notably reduced, particularly in physical and

psychological domains, suggesting a substantial impact of allergic rhinitis on daily functioning and mental well-being.

Table 3: Comparison of Quality-of-Life Domains by Gender

Variables	Male		Female		P-value
	Mean	SD	Mean	SD	
Physical health	9.211	2.639	9.211	2.639	0.643
Psychological Function	8.038	2.457	8.358	2.644	0.395
Social relationship	4.783	0.916	4.771	1.214	0.887
Environment	10.557	3.272	10.725	3.407	0.892

Mann-Whitney U test was done

[Table 3] shows the comparison of quality-of-life domain scores between male and female participants using the Mann–Whitney U test. The mean scores for physical health were the same in both males and females (Mean = 9.211, SD = 2.639). For psychological function, females had a slightly higher mean score (Mean = 8.358, SD = 2.644) compared to males (Mean = 8.038, SD = 2.457). Similarly, the mean scores for social relationship and environment domains were

comparable between the two genders.

However, the p-values for all domains were greater than 0.05, indicating that the differences observed between male and female participants are not statistically significant. Therefore, the results suggest that gender does not have a significant influence on the quality-of-life domains among the study participants.

Table 4: Correlation Between SFAR Score and Quality of Life Domains

Variables	Correlation value	p-value
Physical health	-0.244	0.000*
Psychological Function	-0.249	0.000*
Social relationship	-0.240	0.000*
Environment	-0.282	0.000*

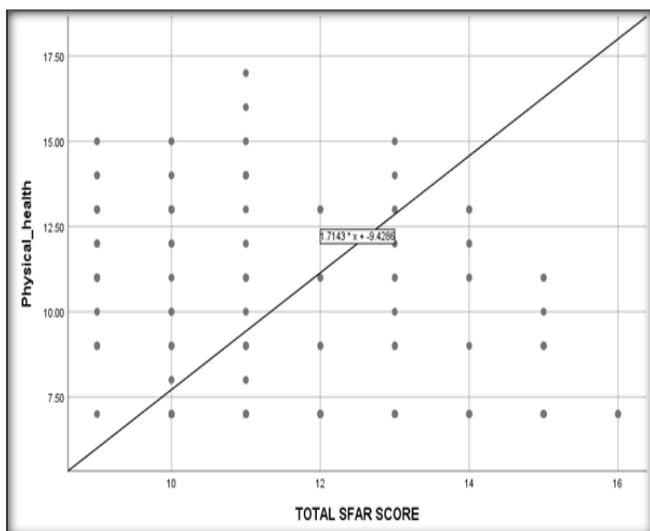


Figure 1: Scatter Plot Showing Correlation Between SFAR Score and Physical Health Domain of Quality of Life

Interpretation: The scatter plot demonstrates the correlation between the Total SFAR mark and the Physical Health sphere of Quality of Life. All of the dots correspond to the score of a particular participant. The regression line presented in the plot has the equation: Physical Health = -9.4286 + (Total SFAR Score)1.7143.

The distribution of points shows that the physical health score decreases as the SFAR score increases, and vice versa; a moderate negative relationship was observed between the two scores. It means that people with higher SFAR scores (more severe rhinitis symptoms) are likely to have worse physical health-related quality of life.

Even though there is some variation among respondents, the general trend shows that the SFAR score correlates with the physical health domain, as confirmed by the correlational findings in the statistical examination. It shows that worsening severity of allergic rhinitis could adversely affect the physical quality of life.

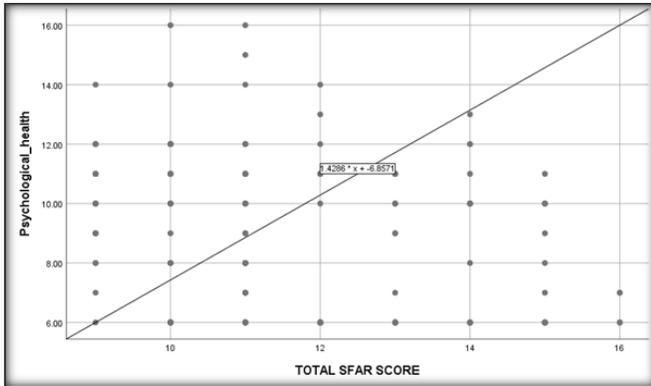


Figure 2: Scatter Plot Showing Correlation Between SFAR Score and Psychological Health Domain of Quality of Life

Interpretation: The scatter plot demonstrates the correlation between the Total SFAR score and the Psychological Health domain of Quality of Life. The points will determine an individual participant's score. The equation shown in the plot, Psychological Health = 1.4286 (Total SFAR Score)- 6.8571, represents the regression line.

The score scatter suggests a negative relationship between psychological health and the SFAR score. This means that increasing SFAR score is associated with continually low psychological health score and the poorest psychological health of the individuals with greater allergic rhinitis severity.

Even though the distribution of scores shows some variation, there is a general tendency, indicating that higher SFAR scores tend to correlate with lower psychological quality of life. This observation confirms the correlation analysis, which showed a statistically significant negative relationship between the SFAR score and the psychological health domain.

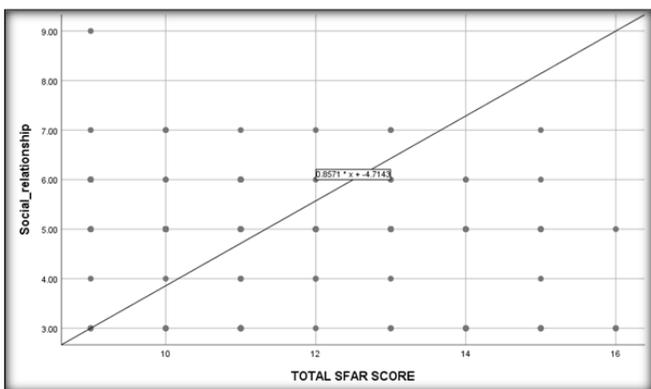


Figure 3: Scatter Plot Showing Correlation Between SFAR Score and Social Relationship Domain of Quality of Life

Interpretation: The scatter plot shows the correlation between the Total SFAR score and the Social Relationship area of the Quality of Life. The points on the plot display the scores of a single participant. The equation means that the regression line in the graph will be Social Relationship = 0.8571 (Total SFAR Score) - 4.7143.

The point allocation suggests that the SFAR score and social

relationship scores are negatively correlated. This implies that the higher the SFAR score, the lower the quality of social relationships, suggesting that social interactions between people with severe allergic rhinitis are poorer.

The data points vary, but the general trend shows a relationship between higher SFAR scores and lower social relationship scores. This finding is similar to the correlation analysis, as the SFAR score and the social relationship domain of quality of life showed a statistically significant negative association.

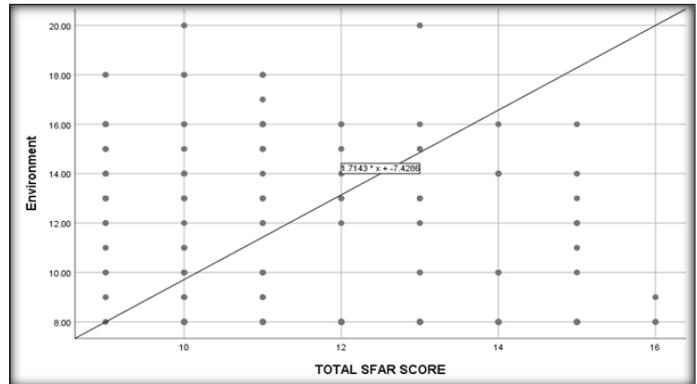


Figure 4: Scatter Plot Showing Correlation Between SFAR Score and Environmental Domain of Quality of Life

Interpretation: The scatter plot shows the association between the Total SFAR score and the Environment domain of the Quality of Life. The graph represents the scores of each participant. The equation that represents the regression graph in the plot would be: Environment = 1.7143 (Total SFAR Score)- 7.4286.

The trend of the data points shows that the SFAR score is negatively related to the environment domain of quality of life. This indicates that, with a higher SFAR score, there is a tendency toward a lower environmental quality of life, suggesting thus having lower environmental quality amongst people with high severity of allergic rhinitis.

Even though there is variation among participants, the general tendency is that a higher level of SFAR correlates with a lower level in the environment domain. This observation is consistent with the correlation analysis, which found a statistically significant negative relationship between the SFAR score and the environment domain of quality of life.

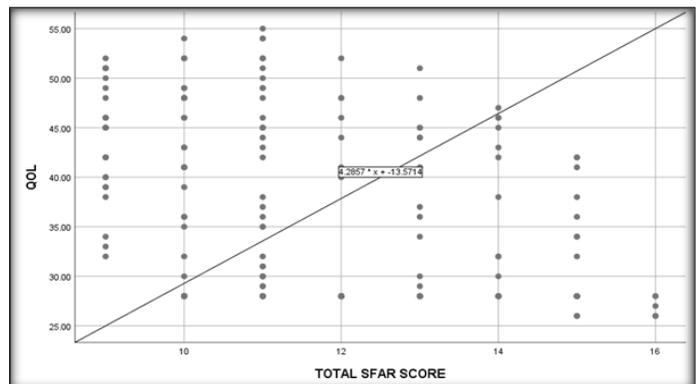


Figure 5: Scatter Plot Showing Correlation Between SFAR Score and Overall Quality of Life Score

Interpretation: The scatter plot shows the correlation between the sum of SFAR scores and the overall Quality of Life (QOL) score of the study participants. All the points reflect the scores of a particular individual participant. The regression line in the graph has the following equation: $QOL = 4.2857 \times (\text{Total SFAR Score}) - 13.5714$.

The data points are dispersed in a way that suggests a negative relationship between the SFAR score and overall quality of life. The latter means that the higher the SFAR score, the lower the quality-of-life score, and therefore the lower the quality of life of people with severe allergic rhinitis.

Given a few deviations among the participants, the plot analysis indicates that the higher the SFAR scores, the worse the overall quality of life.

This observation supports the correlation analysis results, which demonstrated a statistically significant negative correlation between the SFAR score and quality-of-life domains.

DISCUSSION

In the present study, 215 patients with allergic rhinitis were evaluated. The mean SFAR score was 11.61 ± 1.89 , indicating moderate disease severity. Quality-of-life assessment using WHOQOL-BREF demonstrated reduced scores across all domains, with the greatest impairment observed in the physical (9.14 ± 2.63) and psychological (8.20 ± 2.55) domains, followed by the environmental (10.64 ± 3.33) and social (4.78 ± 1.07) domains. A statistically significant negative correlation was observed between SFAR score and all QoL domains, including physical ($r = -0.244$), psychological ($r = -0.249$), social ($r = -0.240$), and environmental ($r = -0.282$, $p < 0.001$), indicating that higher disease severity is associated with poorer quality of life. No significant gender differences were noted (p -values 0.395–0.892).

These findings are comparable to those of Moitra et al,^[10] who reported that patients with uncontrolled allergic rhinitis had significantly reduced HRQL scores, particularly in the physical and psychological domains. While their study used broader HRQL measures, they demonstrated that worsening symptom control was associated with a marked decline in quality-of-life scores. In the present study, a similar pattern is evident: moderate SFAR scores (11.61) correspond to reduced WHOQOL domain scores and to moderate negative correlations ($r \approx -0.24$ to -0.28), confirming that increasing symptom burden leads to measurable deterioration in HRQL. Patel et al,^[11] found in an Indian study that over 60 percent of daily activities and emotional well-being could be moderately-severely impaired among patients with allergic rhinitis.

symptom severity. Compared with previous studies, the current study reported median scores of 7.00 in the physical and psychological domains, indicating moderate impairment. This resemblance indicates that the extent of decrease in quality of life in the current study is comparable to that observed in Indian tertiary care, which verifies the influence of disease severity on HRQL.

According to Agrawal et al,^[12] allergic rhinitis has a great impact on sleep, productivity, and daily functioning, resulting in lower quality-of-life scores. Although they did not describe the numerical QoL scores, they highlighted functional impairment as a major outcome. The lower scores for physical (9.14 ± 2.63) and psychological (8.20 ± 2.55) in the current research indirectly indicate the same functional limitations in terms of fatigue, poor concentration, and reduced efficiency, as their conclusions suggest.

According to a review by Srivastava et al,^[13] allergic rhinitis is observed across all domains of HRQL, with physical and psychological well-being affected most. This is in line with the current results, in which these two domains recorded the lowest scores relative to social (4.78 ± 1.07) and environmental domains. The comparatively lower impairment in the social domain observed in the current study can be explained by the fact that the younger age group (mean age 25.37 years) is likely to continue social interaction despite symptoms.

Chilakamarri et al.'s study,^[14] reported a prevalence of 18.8% for allergic rhinitis among medical students and indicated that it was extremely debilitating for quality of life and productivity at work. They also established that the more the symptoms, the more the functional outcomes deteriorated. This is directly equivalent to the current study, wherein increasing SFAR scores were statistically significantly and negatively correlated with all domains of QoL (r ranged from -0.240 to -0.282), demonstrating the similarity in the degree of severity-QoL.

Bousquet et al,^[15] state that allergic rhinitis is a serious issue that impacts sleep, cognition, and daily activities and results in decreased quality of life. The total QoL in the current study was 35.29 (ought to be 35.29) 8.74, which is a moderate level of impairment, thus confirming their finding that AR is not a trivial illness but one with significant implications for functioning.

A systematic review by Wang et al,^[16] found that allergic rhinitis resulted in moderate decreases in HRQL, especially in areas of physical and emotional impairment, and that symptom severity was strongly correlated with deterioration of QoL. The current research already shows nearly the same results, indicating moderate negative correlation coefficients ($r = -0.24$ to -0.28) and suggesting an important relationship between disease severity and HRQL.

Additionally, Moitra et al,^[17] noted that allergic rhinitis has detrimental effects on sleep quality and work productivity, and that it leads to deterioration in overall quality of life. Despite the absence of sleep-specific measures in the study, the lower level in the physical and environmental domain indicates poorer daily functioning and environmental adaptability, which, in turn, suggests similar outcomes.

Singh et al,^[18] reported significantly lower scores across all domains in an Indian study using the WHOQOL-BREF, with the lowest scores observed in the physical and psychological domains. Their described trend is very close to the current research results on physical (9.14 ± 2.63) and psychological (8.20 ± 2.55) domain impairment, which support the similarity of the WHOQOL-BREF results across Indian populations.

The current research showed moderate disease severity (SFAR: 11.61 (1.89)) and lower QoL across all domains, although the physical (9.14 ± 2.63) and psychological (8.20 ± 2.55) domains appeared to be the most troubled. The correlation between

disease severity and QoL showed significant negative correlations ($r = -0.244$ for physical, -0.249 for psychological, -0.240 for social, and -0.282 for environment; $p < 0.001$), indicating that the higher the severity, the lower the QoL.

Wise et al,^[19] have reported that in moderate to severe allergic rhinitis, patients have a large impairment of sleep, daily functioning, and mental health. Likewise, physical (9.14) and psychological domain scores (SFAR 11.61) decreased significantly in patients with moderate disease in the current study, indicating that moderate disease is associated with significant QoL impairment.

According to Gotua et al,^[20] patient-reported outcomes deteriorate directly with increasing symptom severity, and they recommended integrated care pathways. Our study experimentally showed that this correlation was significant, with negative correlations of significance across all QoL domains ($r = -0.240$ to -0.282), supporting the severity-QoL relationship.

Meltzer et al,^[21] demonstrated that small differences in QoL scores are clinically meaningful (MCID). Compared with the WHOQOL, our research showed a steady decline across all sub-domains, with a mean overall QoL of 35.29 and a standard deviation of 8.74, indicating clinically significant debilitation.

According to Wise et al,^[22] and Bousquet et al,^[23] the physical and psychological domains are most affected, with daily activities and well-being greatly impacted. It is directly indicated in our results that the physical (9.14 ± 2.63) and psychological (8.20 ± 2.55) domains were lowest (compared with the environment (10.64 ± 3.33) and the social domains (4.78 ± 1.07)).

The study by Asher et al,^[24] also established a very high prevalence rate of allergic rhinitis in younger age groups worldwide. On the same note, the mean age of our study population was 25.37, with a standard error of 5.81 years, indicating a high impact on young adults who may lose productivity and have poor functional competence.

According to Bauchau and Durham,^[25] the underdiagnosis of allergic rhinitis was often followed by persistence, leading to lower QoL, and their subsequent investigation,^[26] revealed that persistent AR is associated with greater impairment. The strong correlations we found in all domains ($p < 0.001$) are evidence of a consistent pattern of disease present at the time of the study that has contributed to long-term decreased QoL. Ciprandi et al,^[27] and Ricca et al,^[28] demonstrated that minimal persistent inflammation is present even in asymptomatic or mild cases of the condition, leading to persistent symptoms. This is why, although the average SFAR scores were moderate (11.61), the patients showed a high level of QoL impairment across all domains, indicating subclinical inflammation.

According to the results of Riediker et al,^[29] air pollution is another major contributor to symptom aggravation and reduced QoL in patients with allergic rhinitis. In line with the above, the environment domain exhibited the strongest negative relationship ($r = -0.282$) in our study, indicating that environmental exposures are very important in deteriorating the quality of life, particularly in urban environments.

CONCLUSION

Allergic rhinitis develops as a persistent disease that significantly affects patient health in multidimensional ways, not only affecting nasal symptoms but also physical functioning, psychological well-being, and daily life performance. The results support the idea that disease burden is strongly correlated with symptom severity and closely linked to peripheral inflammatory processes, even in seemingly mild cases.

The paper also emphasizes the necessity of shifting towards a patient-centered paradigm that involves not only a symptom-based perspective but also a quality-of-life-based approach, as posited by international regulations. Using standardized instruments provides a more complete overview of how the disease affects individuals and enables individualized management.

The overall effect, the environmental factor, and the prevalence of disease among young populations highlight the importance of prevention measures, early detection, and specific interventions. On the whole, allergic rhinitis should be considered a clinically important community health issue, and combined care strategies should be used to enhance overall patient quality of life and survival.

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Conflicts of interest

There are no conflicts of interest.

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