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Comparison of the Quality of Life in Patients with Bronchial Asthma and Allergic Rhinitis in the Young Population

Preeti Kaushik[1], Sanjaykumar J Joshi[1], Sidharthsinh Jadeja[2]*

[1]Assistant Professor, GMERS Medical College, Porbandar, Gujarat, India
[2]Senior Resident, Dept of General Medicine, GMERS Medical College, Porbandar, Gujarat, India

***Address for Correspondence:** Dr. Sidharthsinh Jadeja, Senior Resident, Dept of General Medicine, GMERS Medical College, Porbandar, Gujarat, India
E-mail: siddharth_jadeja83@yahoo.co.in

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ABSTRACT

Background: The prevalent chronic airway disorders, including allergic rhinitis (AR) and bronchial asthma (BA), share overlapping pathophysiological mechanisms. Both conditions consist of physical, emotional, and social impairment, reducing health-related quality of life (HRQOL). Asthma and AR coexist, and their combined effects on HRQOL underscore the need to evaluate clinical, pulmonary, and quality-of-life characteristics among affected patients. This study aimed to compare the quality of life in young patients with bronchial asthma and allergic rhinitis.

Methods: This cross-sectional comparative study was conducted over one year at a tertiary care hospital and included 120 adults diagnosed with bronchial asthma and/or allergic rhinitis. Eligible patients were randomly allocated to three diagnostic groups and evaluated using standardized questionnaires, laboratory investigations, pulmonary function testing per American Thoracic Society (ATS) guidelines, and quality-of-life instruments. Data were analysed using SPSS v27, applying appropriate descriptive and inferential statistical tests with a significance level of $p<0.05$.

Results: Among 120 participants, most were aged ≥40 years (59.0%) and female (56.6%), with a predominance of lower socioeconomic status (67.5%). Dyspnea was mainly mild to moderate, with mMRC grade 2 in 52.5%. Pulmonary function showed modest post-test improvement, with a significant rise in FEV_1/FVC (MD 4.10; 95% CI 0.45–7.80). Across groups, demographics were comparable ($p>0.05$), while eosinophil percentage ($p<0.001$), AEC ($p=0.01$), BMI ($p=0.02$), gender ($p=0.02$), symptom profiles ($p<0.001$), and SF-36 scores ($p<0.001$) differed significantly.

Conclusion: The study concluded that pulmonary function testing showed modest yet clinically relevant improvement, with a significant rise in FEV_1/FVC ratio indicating reduced airflow limitation. Distinct inflammatory and symptomatic differences support the unified airway concept and highlight the need for phenotype-based, targeted management strategies.

Key-words: Allergic rhinitis, Bronchial asthma, SF-36, Health-related quality of life

INTRODUCTION

Allergic rhinitis (AR) is a type of the most prevalent chronic condition, whose prevalence is reported to be between 3 and 19% across different countries. AR is a heterogeneous disorder that includes seasonal AR (SAR) symptoms (hay fever) as well as the more challenging diagnosis, perennial AR (PAR). It occurs in 20% of the global population.

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Allergic rhinitis is an allergic inflammation of the airways, a highly prevalent disease with an occurrence of 5 to 50% in children and 10 to 30% in adults. These vary with many factors (e.g., age, sex, social/economic impact, and/or different geographic zones in consideration) [1,2].

Asthma is also heterogeneous, and its definitions are problematic due to its complexity, which may reflect a grouping of various phenotypes, as Wenzel noted. The majority of clinical definitions expound on the symptoms (e.g., wheezing and difficulty breathing) of lung function, of exacerbations, and, frequently, on the response to medication (e.g., high-dose corticosteroids) [2,3]. Some estimates indicate 4-11% of the general population has asthma. Asthma is a serious global health problem and is manifested as a chronic inflammatory disease affecting

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children and adolescents. The disease features inflammation of the small airways, a typical feature marked by bronchial inflammation and often strongly influenced by allergens, irritants, or infections [4,5].

In the majority of cases, the occurrence of allergic diseases is accompanied by other conditions, and AR is not an exception. In the world, various studies have consistently shown that AR and asthma often coexist in the same patient. AR and asthma are both immunoglobulin E-mediated allergies, triggered by similar allergens and sharing interrelated inflammatory and pathophysiological pathways. Thus, the presence of AR should be considered a determinant of asthma incidence and severity. In addition, the associated rhinitis is not adequately recognized, as treatment focuses primarily on asthma [4-6].

Health-related quality of Life (HRQOL) has been viewed as a significant variable that can be controlled in airways diseases. HRQOL can be decreased because of significant physical and psychosocial complications due to allergy and asthma. Asthma patients also have rhinitis, which limits their quality of life. Nevertheless, the effects of allergic rhinitis on asthmatic patients have not been studied [7]. Allergy and asthma are highly prevalent disorders that have been identified as contributors to low quality of life. These two diseases share significant aspects of pathogenesis and are generally regarded as manifestations of a common underlying atopic condition. Asthma symptoms impair a patient's physical, emotional, and social well-being. Similarly, non-nasal manifestations of allergies can complicate allergic rhinitis [8,9].

MATERIALS AND METHODS

Research design- This was a cross-sectional comparative study to evaluate the quality of life of patients with bronchial asthma and allergic rhinitis. The study was conducted at our Tertiary care hospital for 1 year. Patients who were diagnosed with bronchial asthma and allergic rhinitis were selected for the study. Total patients was 120. Patients aged 18 years or older were selected for the study. Both male and female gender patients were considered for the study. Exclusion criteria typically included patients with respiratory comorbidities, respiratory tract infections, and contraindications to PET. Well-informed and written consent was obtained for the study.

Inclusion criteria

- Patients aged 18 years old were selected for the study.
- Patients diagnosed with signs and symptoms of bronchial asthma and/or allergic rhinitis were included.
- Both male and female genders were considered.
- Written informed consent was taken for the study.
- Patients underwent pulmonary function testing (PFT) according to ATS guidelines.

Exclusion criteria

- Patients diagnosed with respiratory comorbidities apart from bronchial asthma or allergic rhinitis, including COPD, pulmonary tuberculosis and many more, were not considered.
- Patients with contradictions observed in pulmonary function testing (PFT) under the ATS guidelines**.**
- Acute respiratory tract infections were not considered.
- Patients diagnosed with severe systemic illnesses affecting lung function were excluded from the study.
- Pregnant women or women in their lactating stage were not considered.

Procedure- Patients aged 18 years or older with signs and symptoms of bronchial asthma and allergic rhinitis were selected and screened according to inclusion and exclusion criteria. Both male and female patients were considered for the study. A total of 120 patients were selected for the study using convenience sampling and evaluated. 120 patients were equally distributed into 3 groups of 40 each based on their diagnostic evaluation. Data collection was performed using a purpose-designed, semi-structured, and pretested questionnaire, and the parameters related to sociodemographic, clinical history, and examination findings were recorded and analysed. Various laboratory investigations were performed, including total blood cell count and eosinophil count. Patients underwent pulmonary function testing according to ATS guidelines, and life was evaluated using standard instruments. Independent variables included patient-reported symptoms, eosinophil count, and parameters of the blood count, while lung function and quality-of-life measures were the dependent variables.

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Statistical Analysis- Data were analysed using SPSS version 27 and entered into the spreadsheet. Frequencies and percentages were used to summarize the categorical variables, and central tendency was used to summarize the continuous variables. Comparison of life quality was analysed between the groups by the chi-square test and the independent *t*-test. Analysis of variance (ANOVA) was performed to compare blood cell counts and pulmonary function test values between the groups. The p-value was set at 0.05 to maintain statistical significance.

RESULTS

Table 1 presents the sociodemographic and employment characteristics of 120 patients. Patients aged 40 years or older were predominantly more common (59.0%) than those aged less than 40 years. Most patients were female (68, 56.6%), and males accounted for 52 (43.4%). 64.2% of employed participants were observed, with a high proportion (approximately 55.0%) in unskilled or semi-skilled occupations. The majority of patients belonged to a low socioeconomic status of around 67.5%. This study's findings indicated that patients were middle-aged, economically strong, and belonged from lower socioeconomic state, which impacts the quality of life of patients with bronchial asthma and allergic rhinitis.

Table 1: Distribution of patients with Socio-demographic and Employment parameters among 120 patients

Variable	Category	n (%)
Age (years)	< 40	49 (41.0%)
	≥ 40	71 (59.0%)
Gender	Female	68 (56.6%)
	Male	52 (43.4%)
Employment Status	Unemployed	43 (35.8%)
	Employed	77 (64.2%)
Type of Employment	Unskilled/Semi-skilled	66 (55.0%)
	Skilled and above	54 (45.0%)
Socioeconomic Status (SES)	Lower	81 (67.5%)
	Middle/Upper	39 (32.5%)

Table 2 shows the distribution of participants by dyspnea severity, as evaluated using the Modified Medical Research Council (mMRC) scale. Majority of patients were classified as grade 2 on the mMRC scale (63; 52.5%), suggesting that more than half of the participants had moderate breathlessness. 30; 25.0% had mild dyspnea and were classified as mMRC grade 1. A significant proportion of patients were noted with moderate-to-severe dyspnea, estimated to be around 21.66%, and were classified under mMRC grade 3. Few patients were in mMRC grade 4 (1; 0.833%). The overall distribution indicated that most patients were presented with mild to moderate dyspnea, showing significant functional impairment.

Table 2: Study participant distribution based on the severity of Dyspnea (mMRC Scale)

mMRC Grade	n (%)
mMRC 1	30 (25.0%)
mMRC 2	63 (52.5%)
mMRC 3	26 (21.66%)
mMRC 4	1 (0.83%)

Table 3 shows the comparative evaluation of the parameters related to the Pulmonary Function Test, demonstrating mild improvement from pre-test to post-test results. Predicted values of FVC, FVC%, FEV_1, and FEV_1% increased significantly, with narrow confidence intervals. Contrastingly, the FEV_1/FVC ratio showed improvement, with pre-test values of 79.80 (16.40); 79.00 (68.00–92.50) and 4.10 (0.45 to 7.80), with MD and 95% CI. The overall results revealed efficacy in limiting airflow. The findings suggested potential impairment of lung function, with a meaningful alteration in the FEV_1/FVC ratio.

Table 4 shows the comparison of continuous variables across the three groups, demonstrating no statistically significant differences in baseline demographic and anthropometric characteristics, including age (38.12±14.85 vs 41.02±15.40 vs 39.00±15.90 years; p=0.67), height (p=0.32), weight (p=0.26), and body mass index (p=0.08), indicating overall comparability of the groups. Similarly, clinical parameters such as symptom duration (p=0.18), past-year symptom frequency (p=0.94), smoking duration (p=0.49), and smoking index (p=0.53) did not differ significantly among patients with

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allergic rhinitis, allergic rhinitis with bronchial asthma, and bronchial asthma. In contrast, hematological markers showed significant intergroup variation, with eosinophil percentage being highest in allergic rhinitis (10.60±1.70) and in allergic rhinitis with bronchial asthma (10.10±1.60) compared with bronchial asthma alone (8.60±1.55), with statistical significance (p<0.001). Absolute eosinophil count was also significantly higher in patients with allergic rhinitis with bronchial asthma (640±230/mm³) compared with the other two groups (p=0.01). Pulmonary function parameters, including pre-test FEV1/FVC (p=0.655) and post-test FEV1/FVC (p=0.09), were comparable across groups. Quality-of-life assessment using SF-36 scores revealed a significant difference, with the highest scores observed in patients with bronchial asthma (96.50±4.00) compared with those with allergic rhinitis (85.00±7.80) and those with allergic rhinitis with bronchial asthma (87.90±8.60), indicating a statistically significant intergroup difference (p<0.001).

Table 3: Comparative evaluation of the parameters related to Pulmonary Function Test, during pre-test and post-test

Parameter	Pre-test	Post-test	MD (95% CI)
FVC (L) predicted	2.18 (0.80); 2.15 (1.55–2.75)	2.24 (0.71); 2.20 (1.70–2.70)	0.06 (-0.14 to 0.26)
FVC % predicted	78.95 (21.50); 80.00 (66.00–96.50)	83.60 (20.10); 86.00 (71.00–95.00)	4.65 (-1.95 to 11.25)
FEV_1 (L) predicted	2.50 (0.90); 1.85 (1.40–2.20)	2.35 (0.85); 1.80 (1.35–2.10)	0.15 (-1.20 to 1.50)
FEV_1 % predicted	71.40 (18.90); 67.00 (55.00–78.50)	75.10 (17.20); 77.00 (68.00–86.50)	3.70 (-8.90 to 16.30)
FEV_1/FVC (%) predicted	79.80 (16.40); 79.00 (68.00–92.50)	83.90 (12.10); 85.00 (76.00–91.00)	4.10 (0.45 to 7.80)

Table 4: Comparison of Continuous Clinical, Anthropometric, Hematological, Pulmonary Function, and Quality-of-Life Variables among Patients in each group and their analysis

Study variables (continuous)	Allergic rhinitis Mean (SD)	Allergic rhinitis with bronchial asthma Mean (SD)	Bronchial asthma Mean (SD)	p-value
Age (in years)	38.12 (14.85)	41.02 (15.40)	39.00 (15.90)	0.67
Height (in cm)	156.05 (9.50)	150.12 (8.90)	153.10 (11.30)	0.32
Weight (in kg)	62.00 (10.50)	61.75 (10.50)	57.95 (12.10)	0.26
BMI (in kg/m²)	26.10 (4.10)	27.60 (4.60)	25.20 (5.05)	0.08
Duration of symptoms (yrs)	11.00 (10.00)	7.50 (7.80)	8.60 (6.40)	0.18
Frequency of symptoms in the past year	5.50 (1.60)	5.60 (1.55)	5.60 (1.80)	0.94
Duration of smoking (yrs)	20.50 (13.00)	17.20 (11.20)	24.50 (14.20)	0.49
Smoking index	38.00 (28.50)	35.00 (31.50)	49.00 (28.50)	0.53
Eosinophil (in %)	10.60 (1.70)	10.10 (1.60)	8.60 (1.55)	<0.001
Absolute Eosinophil Count (AEC) (/mm³)	545.00 (100.00)	640.00 (230.00)	545.00 (113.00)	0.01
Pre-test FEV1/FVC (in %)	79.00 (17.00)	80.00 (16.00)	82.50 (17.20)	0.655

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Post-test FEV1/FVC (in %)	80.50 (11.50)	86.80 (12.50)	84.00 (13.10)	0.09
SF-36 Scores	85.00 (7.80)	87.90 (8.60)	96.50 (4.00)	<0.001

The distribution of demographic, socioeconomic, and lifestyle variables revealed selective intergroup differences. Gender showed a statistically significant difference across the three groups (p=0.021), with a higher proportion of females in the allergic rhinitis with bronchial asthma group (75.0%) than in the allergic rhinitis alone (42.5%) or bronchial asthma (52.5%) groups. Employment status was comparable across groups, with no significant difference between employed and unemployed participants (p=0.73). Similarly, employment type showed a similar pattern, with unskilled or semi-skilled work predominating across all groups, without significant intergroup variation (p=0.37). Socioeconomic status demonstrated a borderline association, with middle- or upper-class status being relatively more frequent in the allergic rhinitis with bronchial asthma group (47.5%) than in the allergic rhinitis (27.5%) or bronchial asthma (22.5%) groups. However, this did not reach conventional statistical significance (p=0.05). Body mass index categories differed significantly among the groups (p=0.02), with overweight or obesity being most prevalent in patients with allergic rhinitis with bronchial asthma (92.5%), followed by allergic rhinitis (75.0%) and bronchial asthma (65.0%). At the same time, normal BMI was more common in the bronchial asthma group. Smoking status did not differ significantly between groups (p=0.18). However, a higher proportion of non-smokers was observed in the allergic rhinitis with bronchial asthma group compared with the other groups (Table 5).

Table 5: Patient distribution for demographic, Socioeconomic, and Lifestyle parameters among patients with Allergic Rhinitis, Allergic Rhinitis with Bronchial Asthma, and Bronchial Asthma

Study variables (Categorical)	**Allergic rhinitis (N=40)**	**Allergic rhinitis with Bronchial Asthma (N=40)**	**Bronchial Asthma (N=40)**	**p-value**
Gender				
Female	17 (42.5%)	30 (75.0%)	21 (52.5%)	0.02
Male	23 (57.5%)	10 (25.0%)	19 (47.5%)	
Employment				
Absent	17 (42.5%)	14 (35.0%)	12 (30.0%)	0.73
Present	23 (57.5%)	26 (65.0%)	28 (70.0%)	
Type of employment (n=78)				
Unskilled/Semi-skilled	30 (75.0%)	26 (65.0%)	30 (75.0%)	0.37
Skilled and above	10 (25.0%)	14 (35.0%)	10 (25.0%)	
SES				
Lower	29 (72.5%)	21 (52.5%)	31 (77.5%)	0.05
Middle/Upper	11 (27.5%)	19 (47.5%)	9 (22.5%)	
BMI				
Underweight	2 (5.0%)	2 (5.0%)	2 (5.0%)	0.02
Overweight/Obese	30 (75.0%)	37 (92.5%)	26 (65.0%)	
Normal	8 (20.0%)	1 (2.5%)	12 (30.0%)	
Smoker				
No	25 (62.5%)	32 (80.0%)	29 (72.5%)	0.18
Yes	15 (37.5%)	8 (20.0%)	11 (27.5%)	

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Table 6 summarizes the symptom presentation of patients with allergic rhinitis (AR), allergic rhinitis with bronchial asthma (AR+BA), and bronchial asthma (BA), 40 patients under each category. The distribution of presenting symptoms showed marked, statistically significant differences across the three groups, reflecting distinct clinical phenotypes. Upper airway symptoms such as running nose (present in 90.0% of allergic rhinitis and 35.0% of allergic rhinitis with bronchial asthma, but absent in bronchial asthma; p<0.001), nasal block (75.0% vs 55.0% vs 0.0%; p<0.001), nasal itching (20.0% vs 27.5% vs 0.0%; p=0.002), sneezing (85.0% vs 52.5% vs 0.0%; p<0.001), and red itchy eyes (70.0% vs 42.5% vs 0.0%; p<0.001) were predominantly observed in patients with allergic rhinitis, either alone or with coexisting bronchial asthma, and were virtually absent in bronchial asthma alone. Sleep disturbance was significantly more frequent in allergic rhinitis (47.5%) and allergic rhinitis with bronchial asthma (37.5%) compared with bronchial asthma (2.5%; p<0.001). In contrast, lower airway symptoms were characteristic of asthma, with breathlessness present in nearly all patients with allergic rhinitis with bronchial asthma (97.5%) and bronchial asthma (100%), but absent in allergic rhinitis (p<0.001). Similarly, wheezing was reported in 97.5% and 100% of patients with allergic rhinitis with bronchial asthma and bronchial asthma, respectively, compared with only 2.5% in allergic rhinitis (p<0.001), while cough was more common in bronchial asthma (60.0%) and allergic rhinitis with bronchial asthma (40.0%) than in allergic rhinitis (7.5%; p<0.001). Symptoms severe enough to limit activities of daily living were significantly more frequent in allergic rhinitis and allergic rhinitis with bronchial asthma compared with bronchial asthma alone (p=0.03). MMRC dyspnea grading did not differ significantly across groups (p=0.231), with grade 2 being the most common in all three categories.

Table 6: Patient distribution according to the symptoms, severity and the frequency of the symptom, across the groups

Presenting symptoms	Allergic rhinitis (N=40)	Allergic rhinitis with bronchial asthma (N=40)	Bronchial Asthma (N=40)	p-value
Running nose				
Absent	4 (10.0%)	26 (65.0%)	40 (100%)	<0.001
Present	36 (90.0%)	14 (35.0%)	0 (0.0%)	
Nasal block				
Absent	10 (25.0%)	18 (45.0%)	40 (100%)	<0.001
Present	30 (75.0%)	22 (55.0%)	0 (0.0%)	
Nasal itching				
Absent	32 (80.0%)	29 (72.5%)	40 (100%)	0.002
Present	8 (20.0%)	11 (27.5%)	0 (0.0%)	
Sleep disturbance				
Absent	21 (52.5%)	25 (62.5%)	39 (97.5%)	<0.001
Present	19 (47.5%)	15 (37.5%)	1 (2.5%)	
Red itchy eyes				
Absent	12 (30.0%)	23 (57.5%)	40 (100%)	<0.001
Present	28 (70.0%)	17 (42.5%)	0 (0.0%)	
Sneezing				
Absent	6 (15.0%)	19 (47.5%)	40 (100%)	<0.001
Present	34 (85.0%)	21 (52.5%)	0 (0.0%)	
Breathlessness				
Absent	40 (100%)	1 (2.5%)	0 (0.0%)	<0.001
Present	0 (0.0%)	39 (97.5%)	40 (100%)	

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Cough				
Absent	37 (92.5%)	24 (60.0%)	16 (40.0%)	<0.001
Present	3 (7.5%)	16 (40.0%)	24 (60.0%)	
Wheezing				
Absent	39 (97.5%)	1 (2.5%)	0 (0.0%)	<0.001
Present	1 (2.5%)	39 (97.5%)	40 (100%)	
Symptoms severe enough to limit ADL				
No	23 (57.5%)	24 (60.0%)	33 (82.5%)	0.03
Yes	17 (42.5%)	16 (40.0%)	7 (17.5%)	
MMRC grading				
1	13 (32.5%)	8 (20.0%)	8 (20.0%)	
2	21 (52.5%)	18 (45.0%)	24 (60.0%)	0.231
3	6 (15.0%)	13 (32.5%)	8 (20.0%)	
4	0 (0.0%)	1 (2.5%)	0 (0.0%)	

Table 7 shows the mean SF-36 scores, revealing that the highest quality of life was reported among the Bronchial Asthma participants (95.68±8.55). This was followed by patients with Allergic Rhinitis and Bronchial Asthma (87.08±3.96) and (85.81±7.73) with Allergic Rhinitis. The lowest score was observed in the Allergic Rhinitis group, which indicated a high impact on health. High variation in scores was observed in the Bronchial Asthma group, suggesting improved well-being.

Table 7: distribution of SF-36 Health-Related life score across the study groups

Study Group	Mean SF-36 Score	SD
Allergic Rhinitis	85.81	7.73
Allergic Rhinitis with Bronchial Asthma	87.08	3.96
Bronchial Asthma	95.68	8.55

DISCUSSION

A study was conducted to evaluate and compare the quality of life of patients with asthma, allergic rhinitis, or both, and to identify the most important variables influencing quality of life. The sample group consisted of patients who showed evidence of bronchial asthma and allergic rhinitis. Patients, who had allergic rhinitis and bronchial asthma had a reduced engagement rate in daily activities compared to their bronchial asthma counterparts. Although independent of the other systems, subjects with isolated allergic rhinitis had reduced health-related quality of life; subjects, who were dual-diagnosed with allergic rhinitis and bronchial asthma had a rather high health-related quality of life [10].

A study evaluated Quality of life (QOL) in asthmatic patients and measured the relative burden of allergic rhinitis on asthmatic QOL. The authors concluded that allergic rhinitis plays a limited role in reducing health-related quality of life (HRQOL). There is a significant decrease in HRQOL in asthmatics with or without rhinitis compared with patients with asthma and only allergic rhinitis; this may be because asthma is more severe than the co-occurring allergic rhinitis. The results suggested that allergic rhinitis does not appear to have any additional negative effect on the quality of life of asthma patients [11].

The study was conducted to determine the effects of allergic rhinitis and asthma on the quality of life of young adolescents in Thailand. The quality of life of young Thai adolescents, especially emotional functioning, is highly affected by allergic rhinitis and asthma. Asthma has a greater negative impact on quality of life than allergic rhinitis, particularly on psychosocial health [12].

A study compared adolescents and young adults (AYAs) with allergies and asthma to healthy controls regarding rates of depressive and anxious symptomatology and health-related quality of life (HRQOL). The findings of the present study indicate that allergic AYAs have a higher risk of having more levels of depressive and anxious symptoms and weakened HRQOL than healthy AYAs. Moreover, they are having psychosocial issues that are equal to or worse than those of the AYAs who have asthma. Allergies, which are commonly considered a

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rather harmless condition, have been largely neglected in the context of psychosocial issues of chronic diseases. The study's findings indicate that young adults with allergies are also a significant group to study [13].

A study investigated the relationships between AR control, asthma control, allergy symptoms, asthma symptoms, and AR QOL of a sample of 195 urban caregivers and their children with asthma (7-9 years of age) of African American, Latino, and non-Latino white backgrounds. Results indicate that interventions to improve AR management among asthmatic urban children could improve AR QOL. Children with non-Latino white are not as impaired in AR QOL due to practical issues (eg, blowing nose) as compared to African American or Latino children with asthma [14].

The relative burden of these diseases has not been reported, but both asthmatics and patients with allergic rhinitis have been found to have impaired quality of life. A cross-sectional survey involving 850 participants in two French centers who had joined the European Community Respiratory Health Survey, a population-based study of young adults, was analyzed using the responses to the SF-36 questionnaire. Asthma and allergic rhinitis were both linked with a quality-of-life impairment. Nevertheless, 78% of asthmatics suffered allergic rhinitis as well. The subjects who had allergic rhinitis and not asthma were more likely than the subjects with neither asthma nor rhinitis to report social activity problems, complaints of day-to-day activities due to emotional problems, and poor mental well-being [15].

LIMITATIONS

The physical limitations were greater among patients with asthma and allergic rhinitis than among those with allergic rhinitis alone. Still, there was no difference between the two groups about concepts of social/mental health. Since asthma was not identified to additionally worsen the quality of life of the subjects with the allergic rhinitis regarding the concepts of mental disability and well-being, and since the subjects with asthma tend also to have allergic rhinitis, future research on the quality of life in asthma must avoid the possibility that the deterioration of the quality of life by the asthma may be caused by the associated allergic rhinitis.

CONCLUSIONS

The study concluded that pulmonary function testing demonstrated a modest yet clinically relevant improvement following intervention, with a statistically significant increase in the FEV_1/FVC ratio, reflecting effective reduction in airflow limitation. Baseline demographic and anthropometric variables were comparable across the study groups; however, inflammatory indices, particularly eosinophil percentage and absolute eosinophil count, exhibited significant intergroup variation. Distinct symptomatology delineated upper airway–predominant disease in allergic rhinitis from lower airway involvement in bronchial asthma and overlap phenotypes, supporting the unified airway concept. Furthermore, health-related quality-of-life scores differed significantly among groups, with comparatively higher SF-36 scores in bronchial asthma, emphasizing the importance of phenotype-oriented evaluation and targeted therapeutic approaches. The clinical relevance of this study lies in its demonstration of distinct inflammatory, functional, and symptomatic profiles across allergic rhinitis, bronchial asthma, and overlap phenotypes, reinforcing the unified airway concept in routine practice. These findings support integrated assessment using pulmonary function testing, eosinophilic markers, and symptom evaluation to guide individualized and optimized management strategies.

CONTRIBUTION OF AUTHORS

Research concept- Sanjaykumar J Joshi, Sidharthsinh Jadeja
Research design- Sanjaykumar J Joshi, Sidharthsinh Jadeja
Supervision- Preeti Kaushik, Sidharthsinh Jadeja
Materials- Preeti Kaushik, Sidharthsinh Jadeja
Data collection- Preeti Kaushik, Sanjaykumar J Joshi
Data analysis and interpretation- Preeti Kaushik, Sidharthsinh Jadeja
Literature search- Preeti Kaushik, Sanjaykumar J Joshi
Writing article- Sanjaykumar J Joshi, Sidharthsinh Jadeja
Critical review- Preeti Kaushik, Sidharthsinh Jadeja
Article editing- Sanjaykumar J Joshi, Sidharthsinh Jadeja
Final approval- Preeti Kaushik, Sidharthsinh Jadeja

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