Central Medical College Journal
Vol 7 No 2 July 2023
DOI: https://doi.org/10.3329/cemecj.v7i2.74422

Original Article

Allergic Rhinitis in Bangladesh: Unveiling the Tapestry of Patterns, Coping Strategies, Risk Factors and Impact on Daily Activities among Adult Population - A Cross-Sectional Study at a Tertiary Hospital

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Abstract

Background: *According to the research, despite the prevalence of allergic rhinitis (AR), it is frequently misdiagnosed or undertreated about its pattern, severity and risk factors.* ***Aim:*** *This study investigated the pattern, severity, and illness features of AR in Cumilla, Bangladesh, as well as symptom-relieving coping strategies among adult population.* ***Methods:*** *We conducted a quantitative observational descriptive cross-sectional study on outpatients from the ENT department of Central Medical College Cumilla, Bangladesh, between January 2020 and February 2023. Initially the sample size was 2949 and finally n= 2,549 participants selected who experienced at least one of the four symptoms of AR, namely runny nose, sneezing, nasal blockage, itchy nose, and watery eyes, unrelated to a cold or flu in the prior year. The study's results were the triggers, pattern, severity, categorization of AR (2016 ARIA criteria), and coping strategies. We did descriptive statistics, univariate analytic statistics, and binary analysis. At <0.05, the P-value was deemed statistically significant.* ***Results:*** *The top AR trigger was dust (58.8%, n = 1500), followed by pollen (15.7%, n = 400), mold (11.88%, n = 300), and fur/perfumes (5.9%, n = 150). The prevalence of intermittent AR was 56 % (n = 1,435) and 44 percent (n = 1,114) for permanent AR. Nearly one-third (n = 816; 32%) complained of mild forms of AR, while the remainder (n = 1733; 68%) complained of moderate to severe types. The most common coping mechanisms were antihistamines (1649; 64.66%) and herbal hot liquids (185). (7.25%).* ***Conclusion:*** *This study examined the patterns, illness features, and related variables of self-reported AR in Cumilla, Bangladesh. Younger age groups and obese individuals who have reported chronic forms of AR should be given special consideration. Males reported more chronic and severe cases of AR.*

Keywords*: Allergic rhinitis, ENT, complications, presentation, triggers, Bangladesh*

Introduction: Allergic rhinitis (AR) is an inflammatory condition of the nasal mucosa brought on by exposure to indoor or outdoor allergens[1]. Immunoglobulin E stimulates mast cells or basophils in the nasal mucosa, leading in the generation of vasoactive mediators such as histamine, which promotes inflammation[2]. AR is characterized by nasal symptoms (congestion, rhinorrhea, itching, and sneezing) and ocular symptoms (itching, redness, and tears)[3]. Significant complaints also include nasal congestion, which, when presenting unilaterally, may indicate the presence of a structural blockage, such as a polyp, foreign body, or deviated septum[4]. Since the symptoms of allergic and non-allergic rhinitis are similar, laboratory testing continue to be the most accurate way for distinguishing the type of rhinitis and the allergens that cause it. AR might escalate to comorbidities such as asthma[6] if upper airway resistance and airflow obstruction occur[5].

Symptoms of AR often manifest after allergen exposure owing to IgE-mediated inflammation of the nasal lining membranes[7]. The symptoms of AR include tiredness, a deterioration in cognitive performance that worsens quality of life, depression, and sleep difficulties[8]. There are numerous triggers for AR, including domestic animals, mites, allergens of plant or animal origin, common outdoor allergens such as mold and pollen, tobacco smoke, occupational triggers such as latex, sulfur oxide and oxides of nitrogen, aspirin, ozone, and non-steroid anti-inflammatory drugs [7]. The chief symptoms of AR include nasal blockage, postnasal drip irritation, sneezing, and rhinorrhea [9]. AR can be characterized as

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Received date: 10 June 2023
Accepted reviewed version date: 12 April 2024

seasonal or perennial, with the former occurring during a certain season and the latter persisting year-round [10].

Despite the fact that AR is a highly widespread condition, it is frequently underdiagnosed or undertreated by physicians[11], according to the literature. Globally, the prevalence of AR is growing. According to a survey by the World Health Organization (WHO), forty percent of the population suffers from at least one allergy illness[12]. AR prevalence is from 10 to 30 percent in adults, whereas it is roughly 40 percent in children [1,5].

AR imposes a major burden on patients; it significantly impacts their social life, academic performance, work productivity, and sleep quality[6]. Avoiding allergen exposure, pharmacological treatment of symptoms with antihistamines and/or corticosteroids, and allergen immunotherapy are therapeutic options for AR [13]. However, AR sufferers frequently rely on alternative or non-pharmaceutical therapies to ease their symptoms and improve their ability to cope with AR exacerbations. Even if these therapies are widely distributed by specialists in alternative medicine, social media, and/or the community, the efficacy of these coping strategies remains subjective since they are reliant on self-experimentation and perceived advantages.

Despite the global expansion of AR, particularly in high-risk nations such as Bangladesh, no research have examined disease features and local coping strategies. Bangladesh is renowned for its recurrent and regular seasons. All four seasons carry several types of germs and dust particles that can cause or aggravate respiratory disorders such as AR and asthma. The purpose of this study was to determine the incidence of illness features among AR patients and to investigate the coping strategies used during an exacerbation. The purpose of the present study was to investigate patterns of AR among patients attending the ENT outpatient department at Central Medical College, Cumilla, Bangladesh.

Materials and Methods

Study design and setting

We conducted a quantitative observational descriptive cross-sectional study on outpatients from the ENT department of Central Medical College Cumilla, Bangladesh, between January 2020 and February 2023. Adults who experienced at least one of the four indications of AR, i.e. a runny, watery nose, sneezing (violent/in bouts), nasal obstruction (inability to breathe), itchy nose; watery/red, itchy eyes, during the last year and unrelated to a cold/flu episode were eligible for the study[14]. Participants were asked whether their symptoms worsened immediately following exposure to one of the four triggers (dust; pollen; fur; mold)[15] revealed a disparity between the incidence of self-reported AR and clinically verified AR. The frequency of self-reported AR in Bangladesh has not been previously published. Accordingly, the sample size was determined to be 2549 based on the reported prevalence of self-reported AR in one study. [15]. The questionnaire centered on biographical information, clinical presentation, repeated triggers, family history, and co-morbidities, in accordance with the purpose of the study and prior research.

Data collection

The data gathering instrument has four primary areas. It was created based on the most frequently reported exposures in the literature (participant characteristics)[16-18] and the 2016 ARIA recommendations that established the AR disease features[19]. The study's exposures were the participants' characteristics, which included sex, age (in years), body mass index (BMI), region of residence, profession, presence of chronic medical problems, disease duration, family history, and smoking status. ARIA has recently defined the pattern of AR based on the duration of reported symptoms as either intermittent or persistent. Intermittent AR occurs 4 days per week for 4 weeks, whereas persistent AR occurs >4 days per week for >4 weeks[20-21]. Intermittent AR individuals reported sneezing, eye symptoms, and watery secretions, but persistent AR patients exhibited seromucous secretions, postnasal drip, olfactory abnormalities, nasal obstruction, and may be related with asthma and chronic sinusitis [22]. The severity of AR (mild versus moderate-severe) is determined by the severity of the symptoms and their influence on quality of life. Mild symptoms do not hinder sleep or everyday activities. Moderate to severe symptoms impact at least one of the aforementioned facets of life.

Received date: 10 June 2023
Accepted reviewed version date: 12 April 2024

Data management and analysis

SPSS and Microsoft Excel were used to enter and analyze the data (version 26, IBM, NY, USA). Statistics such as the mean, standard deviation, frequency, and percentages were used to describe the characteristics of the individuals and the disease. Using Pearson's Chi-square, disease features were examined as categorical variables. The data were presented and tabulated, with a P-value of <0.05 indicating statistical significance.

Ethical consideration

The ethical permission was received from the ethics review committee of Central medical college. Prior to data collection, patients were told about the project and they consented, and anonymity was maintained throughout the study by removing their names and other personal identifiers. Confidentiality was strictly maintained during data processing and report writing.

Results:

Table 1 displays the sociodemographic characteristics of 2,549 participants with allergic rhinitis (AR). The distribution by sex shows that 45.07% were male (N=1,149), and 54.93% were female (N=1,400). Regarding age, the majority (48.98%, N=1,249) fell within the 18-30 range, followed by 30-40 (30.77%, N=785), and ≥40 (20.25%, N=515) years. The mean age was 26.22 years (±10.1 SD). In terms of BMI, the prevalence among participants was as follows: underweight (6.0%, N=160), normal weight (30.5%, N=773), overweight (28.5%, N=721), and obese (35.0%, N=895). The mean BMI was 28.34 (±5.9 SD). The majority of participants resided in urban areas (62.37%, N=1,589) compared to rural areas (37.63%, N=960).Regarding smoking status, 34.38% (N=877) reported being smokers, while 65.62% (N=1,672) were non-smokers. Concerning chronic medical conditions, 58.34% (N=1,488) reported no chronic conditions, while 41.66% (N=1,061) had at least one chronic condition.Furthermore, 72.53% (N=1,849) of participants had a family history of allergic rhinitis, while 27.47% (N=700) did not.

Table 1: Sociodemographic characters of study participants with allergic rhinitis-AR (N= 2549)

Variables	Frequency (No.)	Percentage (%)
Sex		
- Male	1149	45.07%
- Female	1400	54.93%
Age (years)		
- 18-30	1249	48.98%
- 30-40	785	30.77%
- ≥ 40	515	20.25%
Mean ± Standard deviation	26.22 ± 10.1	
BMI		
- Underweight (<18.5)	160	6.0%
- Normal (18.5–24.9)	773	30.5%
- Overweight (25–29.9)	721	28.5%
- Obese (≥30)	895	35.0%
Mean ± Standard deviation	28.34 ± 5.9	
Residence		
- Urban	1589	62.37%
- Rural	960	37.63%
Smoking Status		
- Yes	877	34.38%
- No	1672	65.62%
Chronic Medical condition		
- None	1488	58.34%
- Yes	1061	41.66%
Family history of Allergic Rhinitis		
- Yes	1849	72.53%
- No	700	27.47%

n: frequency, %: percentage

Table 2 presents the risk factors associated with allergic rhinitis (AR) among the study participants. The table is divided into three sections: Allergy Triggers, Signs and Symptoms of Allergy, and Allergy Relation to Certain Period of the Year.Table 2 provides insights into the risk factors associated with allergic rhinitis (AR) among the study participants. The most common allergy triggers reported were dust (58.8%) and pollen (15.7%), followed by mold (11.8%), fur/fumes (5.9%), animals like dogs/cats (3.9%), moth/insects (2.0%), and temperature/ weather changes (1.9%). Participants experienced symptoms such as nasal obstruction (35.3%), sneezing (31.4%), runny nose (15.7%), itchy nose (11.8%), and itchy skin/watery eyes (5.8%). Allergies were associated with different seasons, with fall (31.4%) being the most prominent, followed by

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Accepted reviewed version date: 12 April 2024

spring (27.5%), summer (23.5%), and winter (17.6%). Understanding these risk factors, including the triggers and symptoms, is crucial for effective management and prevention of allergic rhinitis.

Table 2: Risk factors for allergic rhinitis (AR) among study participants (N=2549)

Variables	Frequency (No.)	Percent (%)
Allergy Triggers		
Pollen	400	15.7
Dust	1500	58.8
Mold	300	11.8
Fur/fumes	150	5.9
Animals like dogs/cats	100	3.9
Moth/insects	50	2.0
Temperature/weather changes	49	1.9
Sign and Symptoms of Allergy		
Sneezing	800	31.4
Runny nose	400	15.7
Nasal Obstruction	900	35.3
Itchy nose	300	11.8
Itchy skin and/or watery eyes	149	5.8
Allergy relation to certain period of the year		
Summer	600	23.5
Spring	700	27.5
Winter	449	17.6
Fall	800	31.4

The figure:1 illustrates the distribution of allergy triggers among the study participants. It indicates that dust was the most prevalent trigger, reported by 58.8% of the participants (1500 individuals). Pollen was the second most common trigger, reported by 15.7% (400 individuals). Mold, fur/ fumes, animals like dogs/ cats, moth/insects, and temperature/ weather changes were less frequently reported triggers, with percentages ranging from 1.9% to 11.8%. These findings provide valuable insights into the specific triggers that contribute to allergic rhinitis among the study population.

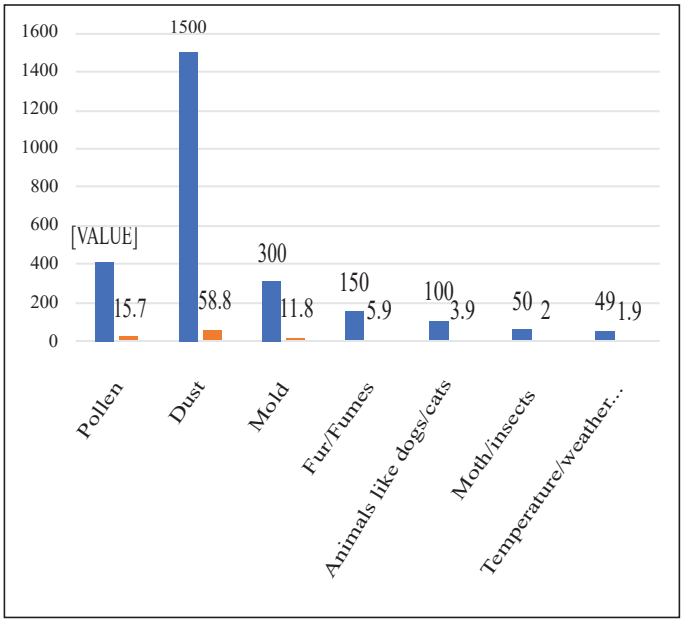

Fig: 01 Distribution of allergy triggers.

Table 3 provides information on the complaints reported by the participants with allergic rhinitis (AR). Among the study participants (N=2549), 56.0% (1435 individuals) experienced intermittent AR, characterized by symptoms occurring less than 4 days a week or less than 4 weeks. In contrast, 44.0% (1114 individuals) reported persistent AR, with symptoms occurring more than 4 days a week or more than 4 weeks. These findings highlight the distribution and frequency of different patterns of AR symptoms among the study participants, distinguishing between intermittent and persistent AR.Table 3 also presents the impact of allergic rhinitis (AR) on sleep quality and daily activities among the study participants. Among the total sample size of 2549 participants, 32.0% (816 individuals) reported not being affected by AR, indicating a mild form of the condition. In contrast, 68.0% (1733 individuals) reported that AR moderately to severely affected their sleep quality and daily activities, representing a moderately-severe form of AR. These findings highlight the substantial impact of AR on individuals' quality of life, underscoring the need for effective management strategies to alleviate symptoms and enhance overall well-being.

Received date: 10 June 2023
Accepted reviewed version date: 12 April 2024

Central Medical College Journal
Vol 7 No 2 July 2023
DOI: https://doi.org/10.3329/cemecj.v7i2.74422

Table 3: Complaints of the participants with allergic rhinitis (N=2549)

Variables	Frequency (No.)	Percent (%)
Duration of symptoms		
Less than 4 days a week or less than 4 weeks (Pattern of AR)*	1435	56.0
More than 4 days a week or more than 4 weeks (Pattern of AR)*	1114	44.0
Frequency of occurrence of stuffy and runny nose		
1-2 times	985	39.0
3-4 times	1500	58.5
No occurrence of stuffy nose	64	2.5
Stuffy and runny nose affects daily activities		
Yes	2445	96.0
No	104	4.0
Difficulty of breathing due to stuffy and runny nose		
Yes	2500	98.0
No	49	2.0
Stuffy nose caused sleep problems		
Yes	2345	92.0
No	204	8.0
AR led to ENT department		
Yes	2449	96.0
No	100	4.0
Allergic rhinitis affects the sleep quality and daily activities (Severity of AR)*		
Not affected	816	32.0
Moderately Affects	564	22.0
Severely Affects	1169	46.0

Figure 2 illustrates the distribution of participants with allergic rhinitis (AR) based on the duration of symptoms. The clustered column chart showcases that 56.0% of the participants experienced intermittent AR, while 44.0% reported persistent AR. This visual depiction provides a clear overview of the prevalence of these two distinct patterns of AR symptoms among the study participants.

In Figure 3, the impact of AR on sleep quality and daily activities is depicted. The clustered column chart presents the proportions of participants reporting different levels of AR severity. It reveals that 32.0% of the participants reported not being affected by AR, indicating a mild form of the condition. Conversely, a significant proportion of 68.0% reported that AR moderately to severely affected their sleep quality and daily activities, representing a moderately-severe form of AR. This visual representation effectively communicates the substantial impact of AR on individuals' quality of life.

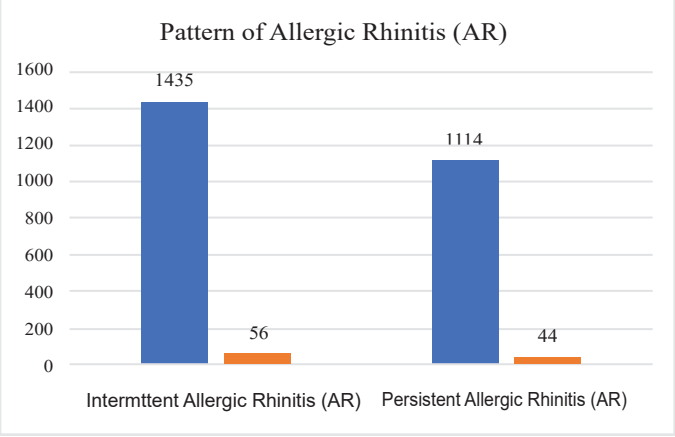

Fig:02 Pattern of Allergic Rhinitis

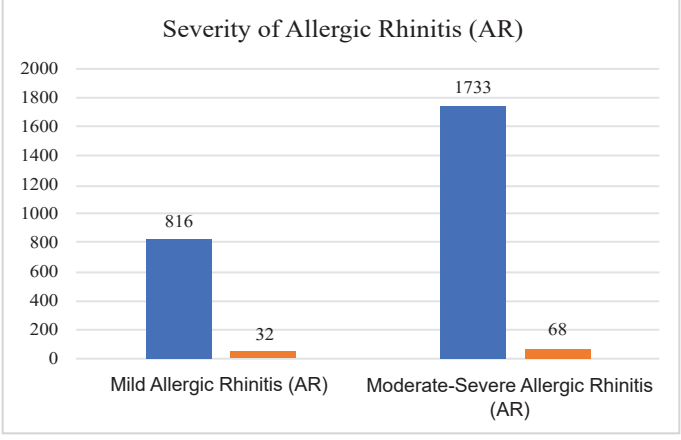

Fig:03 Severity of Allergic Rhinitis

Together, these figures provide a comprehensive and visual summary of the distribution of patterns of AR symptoms and their impact on participants' lives as severity of allergic rhinitis.

Table 4 presents the utilization of conventional and unconventional coping measures among the participants diagnosed with allergic rhinitis (AR). Out of the total sample size of 2549 participants, the majority (64.66%, n=1649) relied on conventional therapies, with antihistamine drugs being the most commonly used. A smaller proportion of participants resorted to hospital visits (1.76%, n=45), inhalers (1.22%, n=31), and steroids (0.43%, n=11) as part of their coping strategies for AR.In addition to conventional therapies, participants also embraced

Received date: 10 June 2023
Accepted reviewed version date: 12 April 2024

DOI: https://doi.org/10.3329/cemecj.v7i2.74422

unconventional approaches to manage their AR symptoms. These included humidification (6.47%, n=165), herbal hot drinks (7.25%, n=185), green/red tea (4.51%, n=115), honey (3.53%, n=90), lotions/oil rubs/vapors (4.83%, n=123), self-prescribed antibiotics (1.10%, n=28), and unnamed drugs from local vendors (4.20%, n=107).

Table 4: Conventional and unconventional AR coping measures (n=2549)

Therapy	Frequency (n)	Percentage (%)
Conventional Therapies		
Antihistamines Drugs	1649	64.66%
Visit Hospital	45	1.76%
Inhalers	31	1.22%
Steroids	11	0.43%
Unconventional Therapies		
Humidification	165	6.47%
Herbal hot drinks	185	7.25%
Green/Red Tea	115	4.51%
Honey	90	3.53%
Lotions/oil rubs/vapors	123	4.83%
Self-prescribed Antibiotics	28	1.10%
Unnamed drugs from local vendor	107	4.20%

n: frequency, %: percentage

Table.5 shows the association between Triggers of Allergic Rhinitis and Sample Characteristics.

Males had a higher prevalence of pollen-triggered allergic rhinitis compared to females (30% vs. 12%). The association was statistically significant ($\chi2 = 21.2$, $p < 0.001$), and the RR for males compared to females was 0.6 [0.5–0.8], indicating a lower risk for females. Also Females had a significantly higher prevalence of dust-triggered allergic rhinitis compared to males (80.0% vs. 61.2%). The association was statistically significant ($\chi2 = 25.6$, $p < 0.001$), and the RR for females compared to males was 1.5 [1.3–1.8], indicating a higher risk for females.

The prevalence of pollen-triggered allergic rhinitis increased with age. The association was statistically significant ($\chi2 = 20.6$, $p < 0.001$), and the RR for the age group ≥40 compared to 18-30 years was 1.56 [1.3–1.9].The prevalence of dust-triggered allergic rhinitis decreased with age. The association was statistically significant ($\chi2 = 15.3$, $p < 0.001$), and the RR for the age group ≥40 compared to 18-30 years was 0.7 [0.6–0.8], indicating a lower risk for older individuals.

There were no significant associations between BMI and positive family history and any of the triggers of allergic rhinitis (pollen, mold, fur/fumes, dust). The p-values for all associations were above 0.05, indicating no statistically significant relationship.

Individuals who smoked had a higher prevalence of pollen-triggered allergic rhinitis compared to non-smokers (8.0% vs. 18.0%). The association was statistically significant ($\chi2 = 4.9$, $p = 0.028$), and the RR for smokers compared to non-smokers was 1.4 [1.0–1.8].Individuals who smoked had a higher prevalence of fur/fumes-triggered allergic rhinitis compared to non-smokers (2.0% vs. 5.0%). The association was statistically significant ($\chi2 = 4.9$, $p = 0.026$), and the RR for smokers compared to non-smokers was 1.7 [1.0–2.7].Non-smokers had a higher prevalence of dust-triggered allergic rhinitis compared to smokers (88.0% vs. 70.0%). The association was statistically significant ($\chi2 = 8.7$, $p = 0.003$), and the RR for non-smokers compared to smokers was 0.7 [0.6–0.9].

Individuals residing in rural areas had a higher prevalence of pollen-triggered allergic rhinitis compared to those in urban areas (21.0% vs. 4.0%). The association was statistically significant ($\chi2 = 4.9$, $p = 0.024$), and the RR for rural residents compared to urban residents was 1.4 [1.0–1.8].Fur/Fumes: Individuals residing in rural areas had a higher prevalence of fur/fumes-triggered allergic rhinitis compared to those in urban areas (5.0% vs. 0.95%). The association was statistically significant ($\chi2 = 4.9$, $p = 0.026$), and the RR for rural residents compared to urban residents was 1.7 [1.0–2.7].Dust: Urban residents had a higher prevalence of dust-triggered allergic rhinitis compared to rural residents (94.1% vs. 69.0%). The association was statistically significant ($\chi2 = 8.7$, $p = 0.002$), and the RR for urban residents compared to rural residents was 0.7 [0.6–0.9].

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Accepted reviewed version date: 12 April 2024

Pattern of Rhinitis: Individuals with persistent rhinitis had a significantly higher prevalence of mold-triggered allergic rhinitis compared to those with intermittent rhinitis (9.0% vs. 3.0%). The association was statistically significant ($\chi2 = 28$, $p = 0.010$), and the RR for persistent rhinitis compared to intermittent rhinitis was 2.9 [1.8–3.7].Dust: Individuals with intermittent rhinitis had a slightly higher prevalence of dust-triggered allergic rhinitis compared to those with persistent rhinitis (79.0% vs. 64.0%). The association was marginally significant ($\chi 2 = 6.6$, $p = 0.100$), and the RR for intermittent rhinitis compared to persistent rhinitis was 0.8 [0.7–0.9].

Severity of Rhinitis:Individuals with mild rhinitis had a higher prevalence of pollen-triggered allergic rhinitis compared to those with moderate to severe rhinitis (15.0% vs. 15.0%). The association was marginally significant ($\chi2 = 6.261$, $p = 0.012$*), and the RR for mild rhinitis compared to moderate to severe rhinitis was 1.3 [1.1–1.6].Dust: Individuals with moderate to severe rhinitis had a slightly lower prevalence of dust-triggered allergic rhinitis compared to those with mild rhinitis (77.0% vs. 75.0%). The association was statistically significant ($\chi2 = 7.91$, $p = 0.005$*), and the RR for moderate to severe rhinitis compared to mild rhinitis was 0.8 [0.6–0.9].

Table 5: Association between main triggers of allergic rhinitis and sample characteristics.

	Pollen	Mold	Fur/Fumes	Dust
	n(%)	n(%)	n(%)	n(%)
Sex				
Male	339(30%)	75(6.0%)	32(2.8%)	703(61.2%)
Female	165(12.0%)	60(4.5%)	50(3.5%)	1125(80.0%)
	$\chi2$ = 21.2,P<0.001*	$\chi2$ = 2.8,P = 0.108	$\chi2$ = 0.5,P = 0.476	$\chi2$ = 25.6,P<0.001*
	RR[95%] = 0.6[0.5–0.8]	RR [95%] = 0.8[0.5–1.1]	RR[95%] = 0.9[0.6–1.2]	RR[95%] = 1.5[1.3–1.8]
Age(years)				
18-30	160(13.0%)	57(4.5%)	63(5.0%)	969(77.5%)
30-40	180(23.0%)	73(9.0%)	47(6.0%)	485(62.0%)
≥40	100 (19.0%)	60 (12.0%)	40 (8.0%)	315 (61.0%)
	$\chi2$ = 20.6,P<0.001*	$\chi2$ = 2.6,P = 0.103	$\chi2$ = 2.9,P = 0.087	$\chi2$ = 15.3,P<0.001*
	RR[95%] = 1.56[1.3–1.9]	RR[95%] = 0.6[0.5–1.0]	RR[95%] = 0.7[0.5–1.1]	RR[95%] = 0.7[0.6–0.8]
BMI				
Underweight/Normal	190(20.0%)	60(7.0%)	50(6.0%)	633(67.0%)
Overweight/ Obese	270(17%)	75(5.0%)	55(3.0%)	1216(75.0%)
	$\chi2$ = 1.118,P = 0.290	$\chi2$ = 0.9,P = 0.328	$\chi2$ = 0.004,P = 0.948	$\chi2$ = 2.0,P = 0.157
	RR[95%] = 1.14[0.9–1.4]	RR[95%] = 1.2[0.8–1.7]	RR[95%] = 1.0[0.7–1.5]	RR[95%] = 0.9[0.7–1.0]
Positive Family history				
Yes	280(15%)	70(4.0%)	50(3.0%)	1449(78.0%)
No	70(10.0%)	20(3.0%)	10(1.0%)	600(86.0%)
	$\chi2$ = 1.229,P = 0.134	$\chi2$ = 0.010,P = 0.459	$\chi2$ = 0.010,P = 0.458	$\chi2$ = 0.010,P = 0.458
	RR[95%] = 1.2[0.9–1.6]	RR[95%] = 1[0.5–1.8]	RR[95%] = 1[0.5–1.8]	RR[95%] = 1[0.5–1.8]
Smoking status				
Yes	70(8.0%)	15(2.0%)	15(2.0%)	777(88.0%)
No	299(18.0%)	111(7.0%)	90(5.0%)	1172(70.0%)
	$\chi2$ = 4.9,P = 0.028*	$\chi2$ = 0.2,P = 0.903	$\chi2$ = 4.9,P = 0.026*	$\chi2$ = 8.7,P = 0.003*
	RR[95%] = 1.4[1.0–1.8]	RR[95%] = 1.0[0.6–1.7]	RR[95%] = 1.7[1.0–2.7]	RR[95%] = 0.7[0.6–0.9]
Residence				
Urban	70(4.0%)	15(0.95%)	15(0.95%)	1489(94.1%)
Rural	200(21.0%)	50(5.0%)	50(5.0%)	660(69.0%)
	$\chi2$ = 4.9,P = 0.024*	$\chi2$ = 0.2,P = 0.903	$\chi2$ = 4.9,P = 0.026*	$\chi2$ = 8.7,P = 0.002*
	RR[95%] = 1.4[1.0–1.8]	RR[95%] = 1.0[0.6–1.7]	RR[95%] = 1.7[1.0–2.7]	RR[95%] = 0.7[0.6–0.9]
Pattern of rhinitis				
Intermittent	190(13.0%)	45(3.0%)	65(5.0%)	1135(79.0%)
Persistent	220(20.0%)	100(9.0)	80(7.0%)	714(64.0%)
	$\chi2$ = 0.091,P = 0.763	$\chi2$ = 28,P = 0.010*	$\chi2$ = 20.5,P = 0.493	$\chi2$ = 6.6,P = 0.100
	RR[95%] = 1.0[0.8–1.3]	RR[95%] = 2.9[1.8–3.7]	RR[95%] = 0.9[0.6–1.3]	RR[95%] = 0.8[0.7–0.9]
Severity of rhinitis				
Mild	122(15.0%)	41(5.5%)	37(4.5%)	616(75.0%)
Moderate to severe	260(15.0%)	80(4.6%)	60(3.4%)	1333(77.0%)
	$\chi2$ = 6.261,P = 0.012*	$\chi2$ = 1.3,P = 0.261	$\chi2$ = 0.7,P = 0.781	$\chi2$ = 7.91,P = 0.005*
	RR[95%] = 1.3[1.1–1.6]	RR[95%] = 1.2[0.9–1.7]	RR[95%] = 1.0[0.7–1.6]	RR[95%] = 0.8[0.6–0.9]

n: frequency, %: percentage, $\chi2$: Pearson Chi-square test, RR: relative risk, [95%]: 95% confidence interval,P: P-value; *: P-value statistically significant at <0.05.

Received date: 10 June 2023
Accepted reviewed version date: 12 April 2024

DOI: https://doi.org/10.3329/cemecj.v7i2.74422

Discussion:

Clinically, AR is characterized as a symptomatic nose condition caused by allergen-induced IgE-mediated inflammation of the nasal membrane[23]. It is the most prevalent respiratory illness, affecting 19 percent of the general population in Europe and 8.8 % to 16 % of the general population in the United States[24,25]. Young adults and teenagers are frequently impacted by AR. The prevalence of AR does, however, start to decline beyond the age of 20[26]. An earlier research found that adults had an AR prevalence of 44%. The frequency of AR in the current research peaked between the ages of 18 and 30 and decreased with advancing years. Another research with same results found that the highest age of AR was 22, which accounted for 25.8% of the total. Additionally, our research's gender distribution of 45.07 percent men and 54.93 percent women is in contrast to a study employing an electronic poll, which found that more women than men had AR[27]. Selection bias can be to blame for this disparity. It has been demonstrated in the past that having a parent with AR increases the probability of getting the condition[28], and other risk factors include smoking, obesity, high blood eosinophils, amplified IgE in the serum, and environmental factors such exposure to urban environments[29,30]. On the other hand, living on a farm was linked to a reduced frequency of AR[31]. In the current study, 72.53% of the patients had a family history of AR. The majority of RA patients (64.1%), according to a study, had a favorable family history [26].

In terms of obesity, more than half of the subjects were both overweight (28.5%) and obese (>30% BMI) (35.0 percent). A prior research found a link between a high BMI and AR[31], although a subsequent study found no correlation[32], suggesting that this topic may require additional examination. In addition, 65.62 percent of our patients claimed that they do not smoke, whereas 34.38 percent are smokers. This figure exceeds the research conducted in Al-Ahssa, in which 6% of patients were smokers and 8% were passive smokers [33].

Dust and pollen were the primary self-reported triggers of AR in this environment, which differed from triggers reported in other Asian nations (dust and animal dander) [35]. In Southwestern Iran, the most prevalent outdoor allergens were weeds, trees, and grass (89 percent), whereas the most prevalent interior allergies were mites (43 percent)[36]. The authors think it is conceivable for the prevalence and severity of AR to differ within the same location. A research done in southern Saudi Arabia found that 43% of individuals had severe AR [37], which is lower than the current study. 68 percent of research participants indicated that severe AR symptoms limited their everyday activities within a 12-month period [34]. Males were much more likely than females to suffer from moderate to severe forms of AR in this scenario, presumably because pollen, a recognized trigger of severe AR, impacted males more than females [38]. It is noteworthy that the growing usage of attractive plants in parks and gardens, public and work areas, and private residences may have produced additional pollen aeroallergen sources [39]. Face masks, which are commonly available and accessible, are advised as crucial pollen protection during peak seasons. Persistent forms of AR were connected with 44.0 percent of moderate-to-severe rhinitis (68 percent) in our research, whereas intermittent forms were associated with 32.0 percent of mild severity AR disorders. This study is consistent with another [40] study. The authors suggest that the severe types of AR are caused by the unanticipated occurrence of particular AR triggers. In other words, despite the fact that persons with AR are typically particularly cautious and take care around AR triggers, their exposure was likely inadvertent or unavoidable. Their symptoms may have been provoked or worsened in the absence of their normal precautions or therapy.

The most often reported nasal symptoms were nasal discharge (15.7%), nasal blockage (35.3%), and frequent sneezing (31.4%). This is consistent with a research in which the most prevalent symptoms were nasal discharge (82%), nasal irritation (70%), and nasal obstruction (69%). The purpose of AR treatment is to alleviate symptoms, and numerous therapeutic alternatives are available, including oral histamines, leukotriene, allergen immunotherapy, avoidance tactics, and intranasal corticosteroids [41]. In the present investigation, oral histamine was the most prevalent therapy (64.66.2%). Despite the fact that a representative sample was selected from the

Received date: 10 June 2023
Accepted reviewed version date: 12 April 2024

research population, there are certain constraints to consider. First, the research design was cross-sectional and descriptive, providing a snapshot of the frequency of each variable without assessing the link between exposure and result. Due to the nature of the study design, memory bias cannot be ruled out.

Limitations:

With the exception of the fact that non-allergic rhinitis does not engage the immune system, the signs and symptoms of allergic and non-allergic rhinitis are similar. Although Prick allergy and blood tests can only distinguish between the two forms of rhinitis, the authors urged participants to note symptoms that were worse following exposure to one of the four triggers. When participants were questioned about the characteristics of the condition and coping mechanisms, in particular, the retrospective study design may have been subject to some degree of recall bias. The authors advise that patients be forced to be fully informed of this information due to the chronic nature of AR.

Conclusion

The clinical characteristics and associated factors of AR in Cumilla, Bangladesh, as reported by the general public, were explored in this study. The main causes of AR were dust, pollen, mold, and hair. In this area, moderate to severe symptoms with an intermittent course were seen in more than 50% of AR patients. Factors associated with pollen-induced RA were male gender, younger age group, smoking, and chronic RA. Mold-induced AR was associated with long-term sickness symptoms, whereas fur-induced AR was connected to smoking. Dust-induced AR was associated with feminine gender, younger age, smoking, and mild disease symptoms. Patients with AR are urged to maintain a healthy weight since being overweight increases the risk of developing chronic forms of the disease.

Declarations

Conflict of Interest Statement

The author declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Funding statement

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Data availability statement

Data will be made available on request.

Ethical Approval

The ethical permission received from the ethics review committee of Central medical college. Prior to data collection, patients were told about the project and consented, and anonymity was maintained throughout the study by removing their names and other personal identifiers. Confidentiality was strictly maintained during data processing and report writing.

Consent to participate

All procedures performed in this study followed the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.Informed consent was obtained from all the enrolled patients.

Consent for Publication: Not applicable

Code Availability: Not applicable

Acknowledgements

I would like to express our gratitude to all of the patients. Additionally, I appreciate the research assistants and authority who supported with the data collection for this research.

References:

1. Roxbury CR, Qiu M, Shargorodsky J, Lin SY, editors. Association between allergic rhinitis and poor sleep parameters in US adults International forum of allergy & rhinology; 2018: Wiley Online Library.

2. Weber RW. Allergic rhinitis. Primary Care: Clinics in Office Practice. 2008;35(1):1–10. 10.1016/j.pop.2007.09.001

3. Shedden A. Impact of nasal congestion on quality of life and work productivity in allergic rhinitis. Treatments in respiratory medicine. 2005;4(6):439–46.

4. Khaltaev N, Bousquet J. Allergic Rhinitis and its Impact on Asthma Update (ARIA 2008) The Perspective From Spain. J Investig Allergol ClinImmunol. 2008;18(5):327–34.

Received date: 10 June 2023
Accepted reviewed version date: 12 April 2024

5. Lin SY, Melvin TAN, Boss EF, Ishman SL, editors. The association between allergic rhinitis and sleep-disordered breathing in children: a systematic review International forum of allergy & rhinology; 2013: Wiley Online Library.

6. Greiner AN, Hellings PW, Rotiroti G, Scadding GK. Allergic rhinitis. The Lancet. 2011; 378(9809): 2112–22.

7. Varshney J, Varshney H. Allergic rhinitis: an overview. Indian J Otolaryngol Head Neck Surg. 2015 Jun;67(2):143–9.

8. Meltzer EO. Quality of life in adults and children with allergic rhinitis. J Allergy Clin Immunol. 2001 Jul;108(1 Suppl):S45–53.

9. Rahman MA, Chakraborty R, Ferdousi KR, Alam A, Chowdhury MK, Paul BK. New Therapeutic Approach to Treat Allergic Rhinitis & Bronchial Asthma, Considering These Two as One United Airway Disease. Mymensingh Med J. 2017 Jan;26(1):216-221. PMID: 28260781.

10. Lee P, Mace S. An approach to allergic rhinitis. Allergy Rounds. 2009;1:1.

11. Nathan RA, editor The burden of allergic rhinitis Allergy and Asthma Proceedings; 2007: OceanSide Publications.

12. Pawankar R, Canonica G, Holgate S, Lockey R, Blaiss M. World Allergy Organization (WAO) white book on allergy. Wisconsin: World Allergy Organisation; 2011.

13. Ivanova JI, Kelkar S, King S, Birnbaum HG, Hocker S, Phipps R, et al. Budget impact model of a 5-grass sublingual immunotherapy tablet for the treatment of grass pollen-induced allergic rhinitis. Journal of medical economics. 2015;18(11):909–18. 10.3111/ 13696998. 2015.1061533

14. Wheatley LM, Togias A. Allergic rhinitis. New England Journal of Medicine. 2015;372 (5): 456–63. 10.1056/NEJMcp1412282

15. Almehizia AA, AlEssa RK, Alwusaidi KM, et al. Allergic rhinitis: Disease characteristics and coping measures in Saudi Arabia. PLoS One. 2019;14(6):e0217182.

16. Gadi G, Wali S, Koshak E, Albar M, Fida A, Abdelaziz M, et al. The prevalence of allergic rhinitis and atopic markers in obstructive sleep apnea. Journal of epidemiology and global health. 2017;7(1):37–44. 10.1016/j. jegh.2016. 06.001

17. Han Y-Y, Forno E, Gogna M, Celedón JC. Obesity and rhinitis in a nationwide study of children and adults in the United States. Journal of Allergy and Clinical Immunology. 2016;137(5):1460–5. 10.1016/ j.jaci.2015. 12.1307

18. Mahboub B, Al-Hammadi S, Prakash VP, Sulaiman N, Blaiss MS, Al Redha A, et al. Prevalence and triggers of allergic rhinitis in the United Arab Emirates. World Allergy Organization Journal. 2014;7(1):1.

19. Brożek JL, Bousquet J, Agache I, Agarwal A, Bachert C, Bosnic-Anticevich S, et al. Allergic Rhinitis and its Impact on Asthma (ARIA) guidelines—2016 revision. Journal of Allergy and Clinical Immunology. 2017;140(4):950–8. 10.1016/j.jaci.2017.03.050

20. Mullol J. Positioning of antihistamines in the Allergic Rhinitis and its Impact on Asthma (ARIA) guidelines. Clinical & Experimental Allergy Reviews. 2012;12(1):17–26.

21. Bousquet J, Khaltaev N, Cruz AA, Denburg J, Fokkens W, Togias A, et al. Allergic rhinitis and its impact on asthma (ARIA) 2008. Allergy. 2008;63:8–160. 10.1111/ j.1398-9995. 2007.01620.x

22. Valero A, Ferrer M, Sastre J, Navarro AM, Monclús L, Martí-Guadaño E, et al. A new criterion by which to discriminate between patients with moderate allergic rhinitis and patients with severe allergic rhinitis based on the Allergic Rhinitis and its Impact on Asthma severity items. Journal of Allergy and Clinical Immunology. 2007;120 (2): 359–65. 10.1016/j. jaci.2007.04.006

Received date: 10 June 2023
Accepted reviewed version date: 12 April 2024

23. Bousquet J, Khaltaev N, Cruz A, Denburg J, Fokkens W, Togias A, et al. Allergic rhinitis and its impact on Asthma (ARIA) 2008. European Journal of Allergy and Clinical Immunology. 2008;63(86):7–160.

24. Bauchau V, Durham SR. Prevalence and rate of diagnosis of AR in Europe. EurRespir J. 2004 Nov;24(5):758–64.

25. Basak P, Arayata R, Brensilver J. Prevalence of specific aeroallergen sensitivity on skin prick test in patients with AR in Westchester County. Internet J Asthma Allergy Immunol. 2008;6(2)

26. Gern JE, Busse WW. Contemporary diagnosis and management of allergic diseases and asthma. Handbook in Health Care Co. 2007.

27. Almehizia AA, Reema KA, Khalid MA, Khalid AA, Modhi A, Sarah A, et al. "Allergic rhinitis: disease characteristics and coping measures in Saudi Arabia" PloS one. 2019;146:e0217182.

28. Westman M, Kull I, Lind T, E Melén, P Stjärne, E Toskala, et al. The link between parental allergy and off-spring allergic and nonallergic rhinitis. Allergy. 2013 Dec;68(12):1571–8.

29. Wright AL, Holberg CJ, Halonen M, Martinez FD, Morgan W, Taussig LM. Epidemiology of physician-diagnosed allergic rhinitis in childhood. Pediatrics. 1994 Dec;94 (6 Pt 1): 895–901.

30. Musaad SM, Patterson T, Ericksen M, Lindsey M, Dietrich K, Succop P, et al. Comparison of anthropometric measures of obesity in childhood allergic asthma: central obesity is most relevant. J Allergy Clin Immunol. 2009 Jun; 123 (6): 1321–7.e12.

31. Law M, Morris JK, Wald N, Luczynska C, Burney P. Changes in atopy over a quarter of a century, based on cross sectional data at three time periods. BMJ. 2005 May 21;330 (7501) :1187–8.

32. Ciprandi G, Pistorio A, Tosca M, Ferraro MR, Cirillo I. "Body mass index, respiratory function and bronchial hyperreactivity in allergic rhinitis and asthma". Respir Med. 2009;103(2):289–95.

33. Sybilski AJ, Raciborski F, Lipiec A, Tomaszewska A, Lusawa A, Furmańczyk K, et al. "Obesity-a risk factor for asthma, but not for atopic dermatitis, allergic rhinitis and sensitization". Public Health Nutr. 2015; 18(3):530–6.

34. Abdulrahman H, Hadi U, Tarraf H, Gharagozlou M, Kamel M, Soliman A, et al. Nasal allergies in the Middle Eastern population: results from the "Allergies in Middle East Survey". American journal of rhinology & allergy. 2012;26(6_suppl): S3–S23.

35. Lee CH, Jang JH, Lee HJ, Kim I-T, Chu MJ, Kim CD, et al. Clinical characteristics of allergic rhinitis according to allergic rhinitis and its impact on asthma guidelines. Clinical and experimental otorhinolaryngology. 2008;1(4): 19610.3342/ceo.2008.1.4.196

36. Assarehzadegan M-A, Shakurnia A, Amini A. The most common aeroallergens in a tropical region in Southwestern Iran. World Allergy Organization Journal. 2013;6(1):1.

37. Yassin A, Maashi R, Zila A, Dilyh N, Dilyh S, Ezzi F, et al. Prevalence of Allergic Rhinitis among Adults, Jazan Region, Saudi Arabia. International Journal of Life Sciences Research. 2017;5(1):10–9.

38. Mansouritorghabeh H, Jabbari-Azad F, Sankian M, Varasteh A, Farid-Hosseini R. The most common allergenic tree pollen grains in the Middle East: a narrative review. Iranian Journal of Medical Sciences. 2017.

39. Baldacci S, Maio S, Cerrai S, Sarno G, Baïz N, Simoni M, et al. Allergy and asthma: Effects of the exposure to particulate matter and biological allergens. Respiratory medicine. 2015;109 (9): 1089–104. 10.1016/j. rmed.2015. 05.017

40. Amizadeh M, Safizadeh H, Bazargan N, Farrokhdoost Z. Survey on the prevalence of allergic rhinitis and its effect on the quality of high school students' life. Iranian journal of otorhinolaryngology. 2013;25(71):79

41. Small P, Kim H. Allergic rhinitis. Allergy Asthma Clin Immunol. 2018 Sep 12;14 (Suppl 2):51.

42. Kalmarzi RN,Khazaei Z, Shahsavar J, Gharibi F, TavakolM,Khazaei S, et al. "The impact of allergic rhinitis on quality of life: a study in western Iran". Biomedical Research and Therapy. 2017;4(9):1629–1637.

Received date: 10 June 2023
Accepted reviewed version date: 12 April 2024