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Allergic Rhinorrhea: Prevalence, Severity, and Risk Factors among Students at University of Nigeria, Enugu Campus

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Abstract | **Original Research Article**

Epidemiological surveys around the world show an increase in allergy disorders. Globalization and urbanization have caused major environmental changes and an increase in allergies in developing countries. Nevertheless, there aren't many studies on Nigerian young adults. This study aimed to ascertain the prevalence, severity, and risk factors of allergic rhinitis among students at the University of Nigeria Enugu Campus using a prospective cross-sectional design. A self-administered structured questionnaire that was adapted from the European Community Respiratory Health Survey served as the research tool for gathering data. To assess the acquired symptoms and demographic information, SPSS version 29.0 was utilised. 200 students between the ages of 18 and 30 participated in the study. There were 110 males and 90 females. The percentage of cases with a doctor's diagnosis was 7.5%, and the prevalence of symptoms of allergic rhinitis during the past 12 months was 37.5% for this patient group. Forty-five percent of people had allergic rhinitis overall. Dust emerged as the most important trigger of symptoms, and environmental factors and family history related to allergies were found to be strongly associated with allergic rhinitis. This study found a significant moderate prevalence of allergic rhinitis in the study population. Mild and intermittent symptoms were more common in cases of allergic rhinitis than severe and chronic symptoms. There was strong evidence that a family history of allergies was associated with allergic rhinitis.

Keywords: Allergic, Prevalence, Rhinitis, Risk Factors, Rhinorrhea, Epidemiological.

INTRODUCTION

Allergic rhinitis is defined as an immunoglobin E (IgE)-mediated, type 1 hypersensitivity response to a spectrum of inhaled environmental allergens (Scadding *et al.,* 2019). This refers to a symptomatic disorder of the nose induced by IgE-mediated inflammation of the membranes of the nose following allergen exposure. Chronic or acute inflammation of the mucous membrane of the nose due to allergens results in the generation of excessive amounts of mucus and fluid, commonly producing runny nose, nasal congestion, nasal and soft palate itching, and sneezing. The immunoglobulin-mediated reaction is also known as antibodies. Allergy has been identified as the most common cause of rhinitis and allergic rhinitis the most common allergic disorder as well as the most common chronic disease in the world. It is common in childhood, adolescence and early adult years in persons of all races. The mean age of onset is 8-11years, peaking by the age of 20 years but can occur at any age (Uche-Okonkwo *et al.,* 2016). Allergic rhinitis (AR) which is an inflammation of the nasal mucosa triggered by allergens is of a great burden to the society for many reasons. One being that the complete etiology for the development of this atopic disease is not yet understood.

Several putative factors for allergic sensitization have been proposed, such as changes in lifestyle; increase in exposure to allergens, pollution, and irritants (smoke, gas, etc.); changes in diet responsible for the diminution of protective nutrient intake; decrease in infections; and stress (Nugmanova *et al.,* 2021). Allergic rhinitis is a global health problem that results in

significant disability. The incidence and prevalence of allergic rhinitis has increased worldwide over the past 10 years, as has the burden it places on already poorly financed health care systems. It is the most common allergic respiratory disorder, affecting 19% of the general population in Europe, 8.8% to 16% in the United States of America (USA), and 39.2% of school children aged 13 to 14 years in Nigeria (Desalu *et al.,* 2009). Allergic rhinitis frequently affects teenagers and young adults, with prevalence decreasing after the age of 20 years. It is associated with limited or severe, incapacitating symptoms that can affect health-related quality of life, leisure activities, and work productivity even though the disease responds effectively to treatment. The pattern of development and severity of symptoms, which invariably co-relates with the seasonal prevalence of specific aero- biological trigger factors, forms the basis of classification of this disease into seasonal, perennial or mixed, or more recently into mild-intermittent, moderate- severe intermittent, mild persistent, and moderate-severe persistent.

While allergic rhinitis itself is not life-threatening, (unless accompanied by severe asthma or anaphylaxis), morbidity from the condition can be quite significant. The disease often co-exists with other disorders such as asthma, atopic dermatitis, eczema and nasal polyps. Other complications that lead to increased morbidity include otitis media, acute sinusitis, chronic sinusitis and Eustachian tube dysfunction. Allergic rhinitis (AR) is prevalent in Nigeria, though little information exists on the allergen. There is no knowledge yet of a national registry from which the prevalence rate can be calculated, but an international review of articles published in English in peer-reviewed journals, a prevalence rate of 35% to 54% was recorded for Nigeria (Ologe *et al*., 2013).

Allergic rhinitis has economic, clinical, and social negative consequences. It can lead to workday loss in adults and school day loss and learning disabilities in children (Kef & Güven 2020). Allergic rhinitis symptoms such as rhinorrhea, sneezing, nasal obstruction, and nasal itching usually lower the quality of life. In fact, millions of people have been reported to experience physical impairments and reductions in quality of life, as well as economic burdens, derived from rhinitis and its associated comorbidities. During college years, allergies can negatively influence life quality on account of interference with day-to- day activities including college attendance, sleep schedules, extracurricular tasks and academic performance.

Allergic rhinitis is common worldwide and significantly impairs the quality of life of affected persons. However, it is still under-diagnosed and under-treated in many countries. In Nigeria, limited studies on AR exist and epidemiological studies based on allergic rhinitis and its associated risk factors are lacking (Adebola *et al.,* 2016). Studying this condition in the Nigerian context can provide valuable data for healthcare professionals and policymakers to develop targeted interventions and public health strategies.

MATERIALS AND METHODS

Location of Study:

The study was carried out in university of Nigeria Enugu Campus (UNEC), a branch of university of Nigeria Nsukka (UNN), Enugu State.

Study Design: A quantitative cross-sectional survey research design was used to achieve the objectives of this study.

Study Population:

This research designed to investigate the prevalence of allergic rhinitis and its associated risk factors, spans the population of undergraduate students of UNEC in Enugu State, Nigeria.

Sample Size:

The cross-sectional data of UNEC students were collected using a questionnaire. The total number of data collected within the research period of study was 200 data.

Ethical Consideration: Ethical clearance for this research was obtained from the research and Ethics Committee of University of Nigeria, Enugu Campus.

Inclusion Criteria:

1. Participants must be between age 18 – 30.
2. Participants who gave consent to participate in the research.
3. Must have been a student of UNEC.

Exclusion Criteria:

1. Non students of UNEC were excluded.
2. Unwilling participants or those who did not give full consent.
3. Participants providing incomplete information.

Instrument for Data Collection:

Questionnaire:

The European Community Respiratory Health Survey (ECRHS, 2024) questionnaire, was modified to elicit responses relevant to the study's aim. The questionnaire had five sections:

Section 1: Demographic Information (5 questions)
Section 2: Prevalence of Allergic Rhinitis (8 questions)
Section 3: Severity for Classification (3 questions)
Section 4: Associated Risk Factors (10 questions)

Data Collection Procedure:

A questionnaire was drafted in Google forms using the European Community Respiratory Health Survey (ECRHS, 2024) and was subjected to scrutiny by the research supervisor and other experts in the field. Their feedback was incorporated to refine the instrument before administering it to participants. The questionnaire

was distributed to different classes and student WhatsApp groups and willing participants filled the questionnaire. Participants were also approached in various locations within the university such as hostels, libraries, cafeterias, and study halls, and the questionnaire was filled by willing students. The responses that met the inclusion criteria were used to conduct the research.

Data Analysis:

Data was analyzed with SPSS version 29.0 using descriptive statistics while data presentation was done using frequency tables, bar charts and pie charts. AR was diagnosed according to criteria proposed by the Allergic Rhinitis and its impact on Asthma (ARIA, 2016) document.

RESULTS

Table 1: Prevalence of Allergic Rhinitis among Students in UNEC

Prevalence by Diagnosis			
	Frequency		Percent
Diagnosed	15		7.5
Self-Diagnosed with 2 or more symptoms	75		37.5
Allergic rhinitis free with 1 symptom	42		21.0
Rhinitis Free with no symptom	68		34.0
Total	200		100.0
Prevalence by Gender			
	Gender		Total
	Male	Female	
Diagnosed	11	4	15
Self-Diagnosed with 2 or more symptoms	65	10	75
Allergic rhinitis free with 1 symptom	15	27	42
Rhinitis Free with no symptom	27	41	68
Total	118	82	200
Symptom Prevalence	**Frequency**	**Percent**	**Valid percent**
Sneezing	76	38	38.4
Runny	21	10.5	10.6
Blocked	33	16.5	16.7
None	68	34	34.3
Missing	2	1	
Total	200	100	100

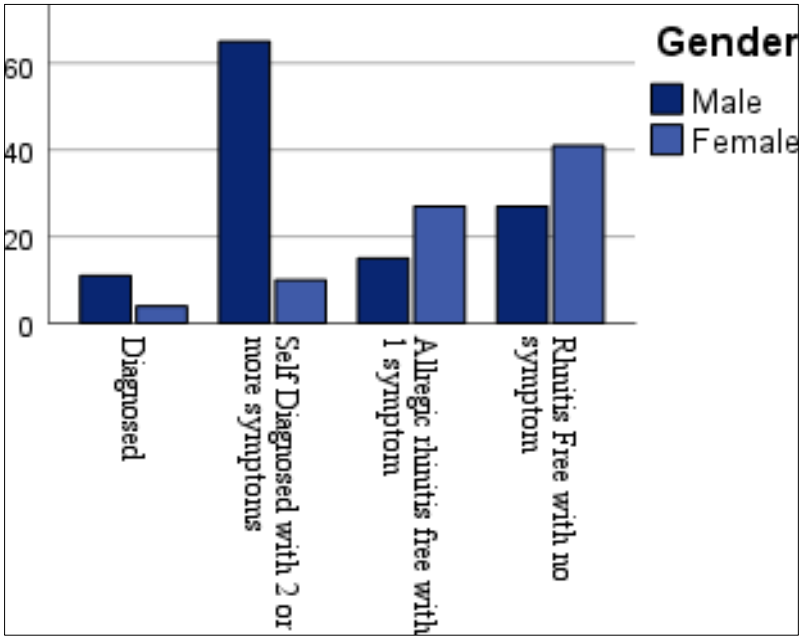

Figure 1: Prevalence of allergic rhinitis among university students in UNEC by diagnosis and gender.

Table 2: Analysis of The Associated Risk and Trigger Factors of allergic rhinitis

Risk Factors	Frequency	Percent	Valid Percent
Personal Medical History	30	15	22.2
Family History	40	20	29.6
Lifestyle	20	10	14.8
Environmental Factors	45	22.5	33.4
Total	135	67.5	100.0
Missing	65	32.5	
Total	200	100.0	
Trigger Factors	**Frequency**	**Percent**	**Valid Percent**
Pollen	20	10	12.1
Dust	77	38.5	46.7
Mold	8	4	4.8
Smoke	10	5	6.1
Strong Odour/ perfume	11	5.5	6.7
Food	11	5.5	6.7
Weather Changes	28	14	16.9
Total	165	82.5	100
Missing	35	17.5	
Total	200	100	

Tables 3: Duration and Severity of Symptoms of Allergic Rhinitis

Symptom Duration				
		Frequency	**Percent**	**Valid Percent**
	Intermittent	70	35.0	77.8
	Persistent	20	10.0	22.2
	Total	90	45.0	100
Missing	System	110	55.0	
Total		200	100.0	
Symptom Severity				
		Frequency	**Percent**	**Valid Percent**
	Mild	69	34.5	76.7
	Severe	21	10.5	23.3
	Total	90	45.0	100
Missing	System	110	55.0	
Total		200	100.0	

DISCUSSION

The main objective of this research was to study the prevalence, severity and associated risk factors of allergic rhinitis among university students in UNEC. The study found varying levels of allergic rhinitis prevalence among university students. While only 7.5% reported formal diagnosis, a significant portion (37.5%) were self-diagnosed based on symptoms making an estimated average of 45%. This compares with other studies carried out among young Nigerians, which have previously shown a prevalence of 56.7% in Ibadan and 54.1% in Babcock, Ogun state. However, the rate was higher than the prevalence rate of 40.5% and 29.6% observed in Ilorin respectively (Oladeji *et al.,* 2015). Possible explanations for this difference are the fact that our study population are more educated, urbanized, and has higher socioeconomic status as compared to the general Nigerian population of same age group. This was also found in Thailand where the prevalence of allergic rhinitis in the university population of Bangkok, was reported to be between 57.4% and 61.9%, as compared with the prevalence of 44.2% in the general population of same age. In other parts of the world, the prevalence of allergic rhinitis varied - Europe (19%), Thailand (57.4%), Bangkok (61%), Turkey (27.1%), Sweden (20.5%), and the USA (20.4%). The reason for this difference may be due to varying environmental factors that influence an individual's genetic susceptibility to developing this disease, in addition to variations in methodologies and age groups studied.

In this study, there was a significant difference between the two sexes. The male gender showed a prevalence of 84.44 % while the female gender showed a general prevalence of 15.56%. This aligns with the study by Nirouei *et al.,* (2023) which showed that the most common risk factors related to allergic rhinitis include male gender, family history of allergy, and atopy. In other studies, the prevalence of Allergic Rhinitis was greater among boys than girls (Amizadeh *et al.,* 2013). Hong *et al.,* (2020) also found that males were more likely to experience sensitization and nasal obstruction

symptoms while females were more likely to experience rhinorrhea and itching.

With regards to symptom prevalence, the study showed that the most prevalent symptom is persistent sneezing, affecting 76 individuals. Runny Nose affected 33 individuals; 21 people suffered from a blocked nose while 68 individuals reported no symptoms at all. This aligns with Kef & Güven (2020) who conducted a study examining 2020 university students in Anatolia. According to their study the most common allergic symptom in the participants was sneezing. Adegbiji *et al.,* (2018) explained the reason for the prevalence of persistent sneezing in their study when they stated that "Sneezing is nasal reflex to expel mucus, irritant or allergens and cleanse the nasal cavity. The sneezing is repeated and can last for days". As in their study, "sneezing start as soon as you breathe in an allergen: dust, smoke and perfume. Also sneezing may occur after waking up in the morning".

The study also highlighted that family history and environmental factors are the most significant risk factors for rhinitis, each contributing to about a quarter of the valid responses. These insights suggest that genetic and environmental elements play prominent roles in rhinitis susceptibility within the group surveyed. This is in line with Oladeji *et al.,* (2015), who found that there is a strong evidence of association between family history of allergy and these allergic disorders. This also compares with Portelli *et al.,* (2015), who said that both environmental and genetic factors influence barrier integrity and sensitization to common environmental allergens. Kef & Güven (2020) also found that students with allergic parents were 114.3% more likely to have allergic rhinitis. Personal and lifestyle factors are also notable contributors and risk factors of allergic rhinitis according to the study.

In this study, dust is the predominant trigger for symptoms, significantly affecting a large portion of the individuals surveyed. This finding collaborated with Uche (2016) where house dust was found to be the commonest allergen in their study, followed by allergy to cold. Desalu (2009) also found dust to be the commonest allergen in their research.

Regarding symptom severity, 35% of participants experienced intermittent symptoms, while 10% reported persistent symptoms. In terms of severity, 34.5% had mild symptoms, and 10.5% experienced severe symptoms. Intermittent and mild symptoms of allergic rhinitis are more commonly reported than persistent and severe symptoms. This corresponds with Amizadeh *et al.,* (2013) who found that According to the ARIA scale, (Allergic Rhinitis and its Impact on Asthma), 41.9% of students had moderate-to-severe rhinitis and 58.1% had mild rhinitis. A total of 43.1% of patients with moderate-to-severe rhinitis had a persistent condition and 56.9% had an intermediate condition. However, this contradicts Ibekwe (2016) who observed that a majority of AR patients were categorized as moderate-severe persistent Allergic Rhinitis, according to ARIA classification, while the least were mild intermittent Allergic Rhinitis. This could be due to a selection bias, since their study was restricted to a hospital setting where patients would more likely present for treatment in hospitals when their condition is severe and persistent.

This study has significant implications for allergy, epidemiological and clinical purposes. The findings highlight the urgent need of targeted interventions, especially considering the increasing prevalence of allergic rhinitis in young adults and the fact that most people with rhinitis symptoms do not present to the physician but prefer unorthodox means of medical care. Additionally, the correlation between allergic rhinitis and its multi morbidities (asthma, allergic conjunctivitis, atopic dermatitis,) critically underscores the need for early detection of trigger factors and aggressive management to preserve nasal, ocular and respiratory functions.

CONCLUSION

The findings on severity and duration further emphasize the varying impact of allergic rhinitis on students' lives, suggesting that tailored approaches are necessary for effective management. By addressing the intricate interplay of prevalence trends, severity of symptoms, risk factors, and socio-demographic influences, healthcare providers can enhance patient education, refine treatment strategies, and contribute significantly to the overall well-being of individuals battling allergic rhinitis in and outside the university context.

Recommendation

There should be educational campaigns targeting students both in UNEC and other parts of Nigeria to increase awareness of allergic rhinitis, its symptoms, and preventive measures.

REFERENCES

- Adebola SO, Abidoye B, Ologe FE, Adebola OE, Oyejola BA (2016). Health-related quality of life and its contributory factors in allergic rhinitis patients in Nigeria. Auris Nasus Larynx. 43(2):171–175.
- Adegbiji WA, Olajide GT, Olajuyin AO, Aremu SK, Olusola AG (2018). Pattern of allergic rhinitis among children in Ekiti, Nigeria. International journal of pediatric otorhinolaryngology.106:75–79.
- Allergic Rhinitis and its Impact on Asthma (ARIA) guidelines-2016 revision. The Journal of allergy and clinical immunology, 140(4), 950–958.
- Amizadeh M, Safizadeh H, Bazargan N & Farrokhdoost Z (2013). Survey on the prevalence of allergic rhinitis and its effect on the quality of high

school students' life. Iran J Otorhinolaryngol, 25(71):79-84.

- Amizadeh M, Safizadeh H, Bazargan N & Farrokhdoost Z (2013). Survey on the prevalence of allergic rhinitis and its effect on the quality of high school students' life. Iran J Otorhinolaryngol, 25(71):79-84.
- Desalu OO, Salami AK, Iseh KR, Oluboyo PO (2009). Prevalence of self-reported allergic rhinitis and its relationship with asthma among adult Nigerians. Journal of investigational allergology & clinical immunology.19(6):474–480.
- Hong, S.N., Won, J.Y., Nam, E.C., Kim, T.S., Ryu, Y.J., Kwon, J.W. (2020). Clinical Manifestations of Allergic Rhinitis by Age and Gender: A 12-Year Single-Center Study. Annals of Otology, Rhinology & Laryngology, 129(9): 910-917.
- Ibekwe PU & Ibekwe TS (2016). Skin Prick Test Analysis in Allergic Rhinitis Patients: A Preliminary Study in Abuja, Nigeria. Journal of Allergy.3219104.
- Kef K & Güven S (2020). The Prevalence of Allergic Rhinitis and Associated Risk Factors among University Students in Anatolia. Journal of asthma and allergy.13:589–597.
- Nirouei M, Sharif R, Sehat M, Rasouli SE, Fayyaz F, Heidarzadeh M (2023). Epidemiology and associated risk factors with allergic rhinitis, acute and chronicrhinosinusitis in Kashan. Revue Française d'Allergologie. 63(1):103254.
- Nugmanova D, Feshchenko Y, Khegay Y, Iashyna L, Gyrina O, Vasylyev A, Mustafayev I, Aliyeva G, Moibenko M, Tariq L, Makarova J (2021). The prevalence of allergic rhinitis, its triggers, and associated factors in Commonwealth of Independent States Countries (Ukraine, Kazakhstan, and Azerbaijan): results of the CORE study. Dubai Medical Journal. 4(2):81-92.
- Oladeji SM, Nwawolo CC, Akinola OO (2015). Prevalence of Allergic Disorders among University Students in a Tertiary Institution in Nigeria. Journal of Dental and Medical Sciences.14(7): 12-16.
- Oladeji SM, Nwawolo CC, Akinola OO (2015). Prevalence of Allergic Disorders among University Students in a Tertiary Institution in Nigeria. Journal of Dental and Medical Sciences.14(7): 12-16.
- Ologe FE, Adebola SO, Dunmade AD, Adeniji KA, Oyejola BA (2013). Symptom score for allergic rhinitis. Otolaryngology--head and neck surgery: official journal of American Academy of Otolaryngology-Head and Neck Surgery. 148(4): 557–563.
- Portelli MA, Hodge E, Sayers I (2015). Genetic risk factors for the development of allergic disease identified by genome-wide association. Clinical and Experimental Allergy.45(1): 21-31.
- Scadding G, Bousquet J, Bachert C, Fokkens W, Hellings P, Prokopakis E, Pfaar O, Price D (2019). Rhinology future trends: 2017 EUFOREA debate on allergic rhinitis. Rhinology. 57:49–56.
- The European Community Respiratory Health Survey II, Main Questionnaire. Accessed on 23 June, 2024. Available at: http://www.ecrhs.org/quests/ecrhsiimainquestionnaire.pdf.
- Uche-Okonkwo K, Akinola M, Jagun O, Oladeji M & Johnson KJ (2016). Allergic Rhinitis: Prevalence and Associated Factors Among Students of A Secondary School in South-west Nigeria. IOSR Journal of Dental and Medical Sciences.15:117-120.