



## Otorhinolaryngological Manifestation of Allergy in South Western Nigerian Children

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### Abstract

**Background:** Allergy is a systemic, chronic and recurrent disorder of otorhinolaryngological importance. This disorder is often neglected with late presentation in paediatric age group. This study aimed at determining the prevalence, sociodemographic features, trigger factors, clinical features, complications, quality of life, associated comorbid illnesses and treatment outcome among children.

**Materials and Methods:** This was a prospective hospital based study of children with allergy in our center. The study was carried out over a period of one year from May 2017 to April 2018. Data were obtained by using pretested self-administered questionnaire. Data obtained were documented, collated and analyzed by using SPSS version 18.0

**Results:** Prevalence of allergy in this study was 8.6%. There were 60.2% male with male to female ratio of 1.5:1. There was positive family history of allergy in 55.9% patients. Perennial allergy was the commonest in 68.3% of the children. Major forms of allergens were 71.5% inhalant and 9.7% ingestant. The common self-reported trigger factors were dust, cold weather and smoke in 58.1%, 41.9% and 22.0% respectively. Major associated comorbid illnesses in this study were 43.5% adenotonsillar hypertrophy. Commonest allergic symptoms were runny nose in 38.7%. The commonest affected organ was nose in 46.8%. Commonly affected quality of life was 22.6% irritability, 20.4% absenteeism, 19.9% sleep disruption and 12.9% impaired social life. Common complications were 48.9% secondary infection, 46.2% otitis media/externa, 44.1% injury, 42.5% foreign body impaction and 40.3% pharyngitis.

Treatment of allergy leads to improvement and recovery from the clinical features in 52.2%. No significant improvement in 47.8%.

**Conclusion:** Allergy is a systemic disease affecting ear, nose and throat. It affects all paediatric age group with associated comorbid illnesses, complications and affection of quality of life at presentation in majority of the patients.

**Keywords:** Otolaryngological; Allergy; Children; South western; Nigeria

### Introduction

Allergy is a hypersensitivity reaction initiated by immunological mechanisms [1] and is usually IgE-antigen mediated hypersensitivity reaction to the allergens [2]. It is a global public health problem with prevalence of 20% to 40% worldwide and the trend is known to be on increase [3-5]. In UK allergy affects up to 30% of adults and 40% of children at some time in their lives [6,7]. Allergy is a chronic multi organ disorder which involves inflammation of the mucous membranes of the nose, sinuses, ear, pharynx, larynx, bronchus and eyes in addition to the skin. This involves a complex interaction of inflammatory mediators which is ultimately triggered by an immunoglobulin E (IgE) [8]. This is mediated by response to an

intrinsic or extrinsic protein called allergens. The allergens include house dust mites, pollen, cat, dog, and molds [9,10]. On exposure to allergen, IgE is cross-linked, and this is the signal that leads to mast cell degranulation in the mucous membrane [11-13].

In addition, assessing the comorbidities of allergic rhinitis may help clinicians to recognize symptoms of allergic rhinitis to achieve early and prompt treatment [14-16].

Poorly controlled allergy may also contribute to the development of other related disease processes including sinusitis, recurrence of nasal polyps, otitis media, hearing impairment, adenotonsillar hypertrophy with sleep apnea and related complications, aggravation and increased propensity to develop asthma [17-19].

Poorly controlled symptoms of allergic rhinitis may also contribute to sleep loss, secondary daytime fatigue, learning impairment,

decreased long-term productivity and decreased quality of life. Treatment of allergic rhinitis with sedating antihistamine therapy may result in poor quality of life [20,21].

The prevalence of allergies in Africa shows a consistent increase over a period of 7-10 years [22]. In African epidemiological data are scarce but the overall prevalence of allergic rhinitis in children is at least 20% to 24% and there is evidence of increasing prevalence [23]. Furthermore many patients do not recognize allergic rhinitis as a disease and therefore do not consult a physician [24]. This study aimed at determining the prevalence, sociodemographic features, trigger factors, clinical features, complications, quality of life, associated comorbid illnesses and treatment outcome among children attending Ekiti state university teaching hospital.

## Material and Methods

This was a prospective hospital-based study of children (18 years or less) with clinical diagnosis of allergy carried out at Ekiti state university teaching hospital Ado Ekiti, Ekiti state. The study was carried out over a period of one year from May 2017 to April 2018.

All consecutive patients who presented with features and diagnosis of allergy to the ear, nose and throat department were enrolled into the study. Informed consent was obtained from patients/guardian/parents before patients were enrolled into the study.

The data collection for this study was by pretested self-administered questionnaire. The information included sociodemographic features, clinical presentation, duration of symptoms, frequency of symptoms and triggering factors. Detailed otorhinolaryngological history was taken from the patients, guardian or parents. Also detailed history on possible comorbid illnesses, complication, aetiological and predisposing factor for allergy was taken. Past medical, surgical, family and social history were taken. All the patients had general physical and systemic examination done. A thorough ear, throat, nose, head and neck examination was done and documented. Radiological investigations such as plain X ray and computerised tomographic scan of the paranasal sinuses were requested based on clinical findings. Haematological test looking for eosinophilia and nasal smear for cytology were carried out. Patient subsequently had medical, surgical or combined form of treatment based on their findings. Participants were followed up in the ear, nose and throat clinic for possible outcome and complications.

All data obtained were documented, collated and analyzed. The data analysis was done by using SPSS version 18.0. The analyzed data were expressed in simple descriptive methods with tables, bar chart and pie chart.

Ethical approval was considered and obtained from the ethical committee of the institution.

## Results

A total of 2167 patients were seen in the ENT department over the study period. There were 186 consented paediatric patients with allergy enrolled into the study. Prevalence of allergy in children in this study was 8.6%.

Allergy affects all the paediatric age group with peaked age group at preschool age group (1-5 years) with prevalence of 38.2%. This is demonstrated in Figure 1.

There were 112 (60.2%) male and 74 (39.8%) female with male to female ratio of 1.5:1. 83 (44.6%) were living in various cities while 49 (26.3%) were from villages. Majority 71 (38.2%) were nursery pupil, 52 (28.0%) are secondary education level while 47 (25.3%) were primary education level. Parent's occupations were 53 (28.5%) farming, 51 (27.4%) teaching and 38 (20.4%) business. This is illustrated in Table 1.

There were positive family history of allergy in 104 (55.9%) patients and there were no family history of allergy in 82 (44.1%) patients. Perennial allergy in 127 (68.3%) were commoner than seasonal allergy in 59 (31.7%) children. Using ARIA classification majority of the patients were 121 (65.1%) moderate-severe persistent allergic rhinitis and 33 (17.7%) moderate-severe intermittent allergic rhinitis. The minority were of the children were mild intermittent allergic rhinitis and accounted for 8 (4.3%) of the study population. Major form of allergens was 133 (71.5%) inhalant and the least form of allergen was 18 (9.7%) ingestant. In this study, self-reported allergy was based on the trigger factors. The commonest identified trigger factors among the study population were as follows: dust, cold weather and smoke which were accounted for 108 (58.1%), 78 (41.9%) and 41 (22.0%) of the study children respectively. The less common trigger factors were soap and perfume which accounted for 11 (5.9%) and 16 (8.6%) children respectively. This is showed in Table 2.

Major associated comorbid illnesses among the children with allergy in this study were 81 (43.5%) adenotonsillar hypertrophy, 43 (23.1%) inferior turbinate hypertrophy and 38 (20.4%) otitis media with effusion. Minor associated comorbid illnesses in this study were allergic dermatitis in 14 (5.3%), sinusitis in 13 (7.0%) and nasal polyps in 12 (6.5%). This is demonstrated in Table 3.

Common allergic symptoms in this study were runny nose in 72 (38.7%), nasal blockage in 61 (32.8%), recurrent sneezing in 53 (28.5%) and nasal itching in 43 (23.1%). Other symptoms are 12 (6.5%) ear water sensation, 17 (9.1%) tearing and 18 (9.7%) eye itching and 19 (10.2%) hoarseness. Symptoms are illustrated in Table 4.

The common clinical findings among the children included rhinorrhea, hyper pigmented nose, reduced nasal patency and bluish oedematous mucosa in 78 (41.9%), 61 (32.8%), 44 (23.7%) and 39 (21.0%) respectively. Other findings are 14 (7.5%) retracted tympanic membrane, 11 (5.9%) red eye, 9 (4.8%) periorbital hyperpigmentation and 4 (2.2%) head and neck urticaria rashes. Clinical sign among the children was shown in Table 5.

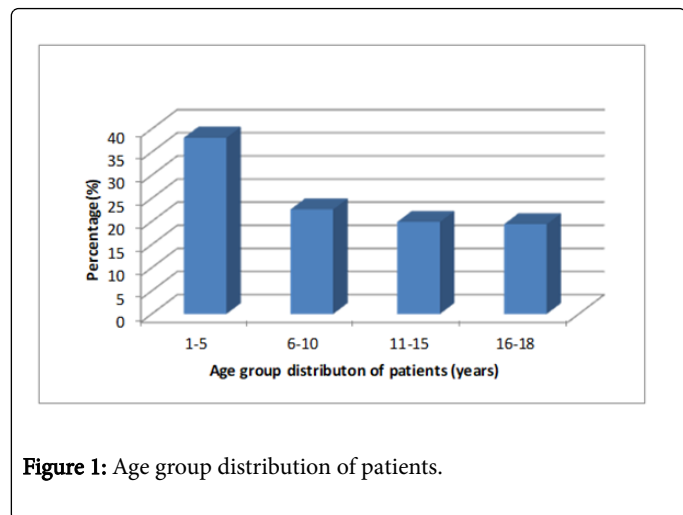
The commonest affected organ in the head and neck region was nose in 87 (46.8%). Other affected organs were ear in 46 (24.7%) and throat in 34 (18.3%). This is illustrated in Figure 2.

Commonly affected quality of life among the children were 42 (22.6%) irritability, 38 (20.4%) absenteeism, 37 (19.9%) sleep disruption and 24 (12.9%) impaired social life. Others were daytime sleepiness 8 (4.3%) and memory deficit 9 (4.8%). This is demonstrated in Table 6.

Common complications which were associated with allergy in this study were 86 (46.2%) otitis media/externa, 82 (44.1%) injury, 79 (42.5%) foreign body impaction and 75 (40.3%) pharyngitis. Less common complication of allergy were 23 (12.4%) orbital complication and 21 (11.3%) pneumonia. This is shown in Figure 3.

Treatment approach was by combination of allergens avoidance, medical treatment and surgery was reserved for comorbid illnesses and complications. Treatment of allergy leads to improvement and recovery on the clinical features in 97 (52.2%) patients. No significant

improvement in clinical features was noticed in 89 (47.8%) patients. None of the studied patients reported worse clinical condition after treatment of allergy. No mortality was recorded from allergy, comorbid illnesses, complications or treatment intervention in our study.



**Figure 1:** Age group distribution of patients.

Sociodemographic features	Number	Percentage (%)
<b>Sex</b>		
Male	112	60.2
Female	74	39.8
<b>Residential</b>		
City	83	44.6
Town	54	29
Village	49	26.3
<b>Education level</b>		
Nursery	71	38.2
Primary	47	25.3
Secondary	52	28
Post-secondary	16	8.6
<b>Parental occupation</b>		
Business	38	20.4
Teaching	51	27.4
Industrial worker	27	14.8
Farming	53	28.5
Health worker	17	9.1

**Table 1:** Sociodemographic features of the patients (N=186).

Features of Allergy	Number	Percentage (%)
<b>Family history of Allergy</b>		

Present	104	55.9
Absent	82	44.1
<b>Type of Allergy</b>		
Perennial	127	68.3
Seasonal	59	31.7
<b>ARIA Classification</b>		
Mild-Intermittent	8	4.3
Moderate-Severe intermittent	33	17.7
Mild-Persistent	24	12.9
Moderate-Severe Persistent	121	65.1
<b>Form of Allergy</b>		
Inhalant	133	71.5
Ingestant	18	9.7
Contactant	35	18.8
<b>Trigger factor</b>		
Dust	108	58.1
Cold weather	78	41.9
Smoke	41	22
Perfume	16	8.6
Vehicle exhaust	24	12.9
Soap	11	5.9

**Table 2:** Features of Allergy among the patients (N=186).

Comorbid illnesses	Number	Percentage (%)
Asthma	23	12.4
Otitis media with effusion	38	20.4
Allergic dermatitis	14	7.5
Recurrent tonsillitis	34	18.3
Adenotonsillar hypertrophy	81	43.5
Inferior turbinate hypertrophy	43	23.1
Nasal polyps	12	6.5
Ear discharge	22	11.8
Sinusitis	13	7

NB: Some patients has more than one comorbid illness.

**Table 3:** Comorbid illnesses.

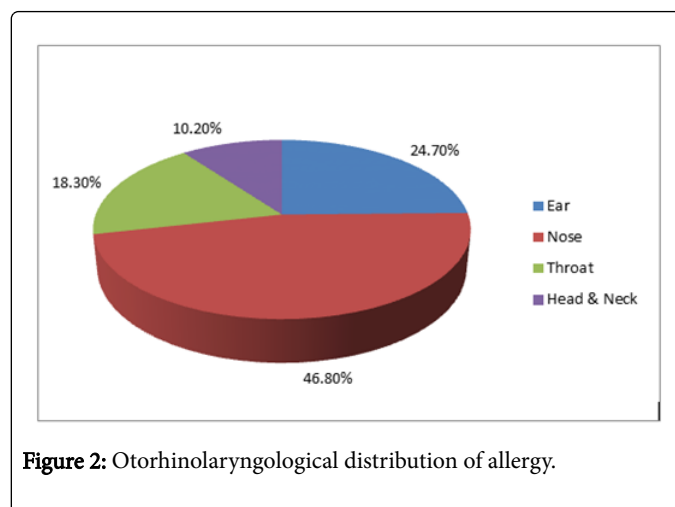
Symptoms	Number	Percentage (%)
Blocked nose	61	32.8

Runny nose	72	38.7
Recurrent sneezing	53	28.5
Nasal itching	43	23.1
Itchy throat	31	16.7
Cough	38	20.4
Post nasal drip	20	10.8
Hoarseness	19	10.2
Sore throat	26	14
Itchy ear	37	19.9
Ear blockage	36	19.4
Ear water sensation	12	6.5
Earache	21	11.3
Tearing	17	9.1
Eye itching	18	9.7
NB : Some patients has more than one symptoms		

**Table 4:** Otorhinolaryngological symptoms among the patients.

Signs	Number	Percentage (%)
Bluish oedematous mucosa	39	21
Enlarged turbinate	37	19.9
Rhinorrhea	78	41.9
Hyperpigmented nose	61	32.8
Reduced nasal patency	44	23.7
Dull tympanic membrane	23	12.4
Retracted tympanic membrane	14	7.5
Enlarged tonsils	21	11.3
Red eye	11	5.9
Periorbital hyperpigmentation	9	4.8
Head and neck urticaria rashes	4	2.2
NB: Some patients presented with more than one clinical signs.		

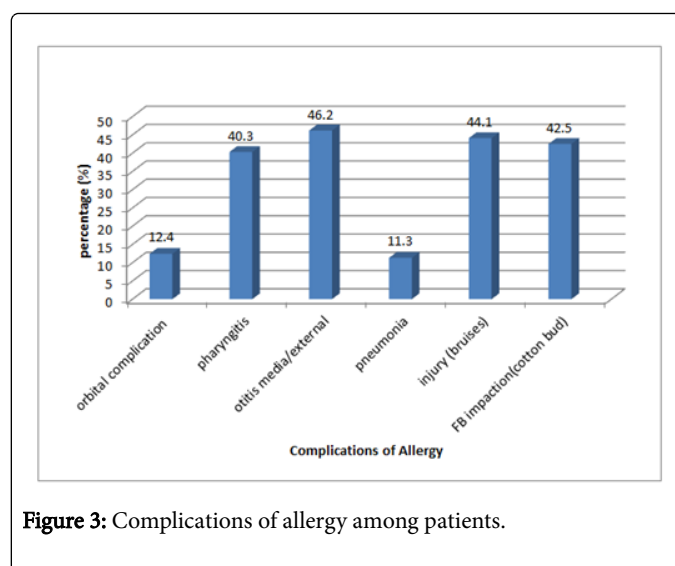
**Table 5:** Otorhinolaryngological clinical signs among the patients.



**Figure 2:** Otorhinolaryngological distribution of allergy.

Quality of life	Number	Percentage (%)
Impaired social life	24	12.9
Sleep disruption	37	19.9
Fatigue	13	7
Daytime sleepiness	8	4.3
Irritability	42	22.6
Memory deficit	9	4.8
Absenteeism	38	20.4
NB: Some patients has more than one complications.		

**Table 6:** Quality of life among the children.



**Figure 3:** Complications of allergy among patients.

## Discussion

Allergic disorder in children is a global healthy problem and under-diagnosed because the symptoms are frequently attributed to infection.

As a result of this most parents use available medication or local herbs without doctor's prescription and such treatment are suboptimal [25].

In this study prevalence of allergy in children was 8.6%. This is lower than prevalence rate in other previous study on nasal allergy [7]. This low prevalence of allergy may be due to under presentation for specialist care as majority of allergic disorder were treated by their family physician or paediatrician. Referred cases to otorhinolaryngologist, head and neck surgeon were severe, complicated or when associated with co-morbid illnesses. Studies in developed part of the world also revealed higher prevalence of nasal allergic disorder [26,27]. Higher prevalence were also reported in some developing country in African countries includes 29.6% in Nigeria and 30% in Cape Town in South Africa [28,29]. Factors responsible for high prevalence of allergy in children include climatic factors, dietary changes; environmental factors and industrial pollution were reported in this study.

There was male preponderance in this study. This observation was in agreement with other study by Alsowaidi et al. [30]. This is different from Brazilian study with female preponderance [31]. Study in Kenyan reported equal sex preponderance [32]. Gender parity findings may likely be by chance.

Environmental factors were responsible for increased risk of allergy among children in this study were dusts, fumes exhausts from vehicle, environmental tobacco smoke exposure and moulds and perfume. This is similar to findings on studies on risks factors of allergic rhinitis [33,34]. There was family history of allergic disorder among majority of children in this study. A similar finding was reported by Herr et al. in their study [35].

Inflammation of the various in the head and neck mucosal lining and contiguous structure from allergens results in different kind of clinical features. These features are recurrent sneezing, rhinorrhoea, nasal congestion, ear water sensation, tearing and itching in the ear; nose, throat, eyes, head and neck were also reported in other study [36]. In this study, high percentage of patients had runny nose (rhinorrhoea), nasal blockage, bout of sneezing, hyper pigmented nose, reduced nasal patency and bluish oedematous mucosa and these findings are similar to other studies on allergic rhinitis [37].

In this study of allergy in children there are associated significant comorbid illnesses such as asthma, sinusitis, otitis media, adenoid hypertrophy and allergic conjunctivitis. This is similar to findings by Haradojo et al. in its study on allergic rhinitis in children [25].

Clinical features of allergy among children such as bout of sneezing, pruritus, rhinorrhoea and nasal obstruction grossly affected quality of life of children in this study. Quality of life that are often affected includes impaired social life, sleep disruption, fatigue, daytime sleepiness, irritability, memory deficit, effect on daily activities such as playing, working and absenteeism [37]. Nasal obstruction and nasal congestion were responsible for the sleep disturbances [37,38].

The two key steps in the process of allergy diagnosis are the medical history and allergy test selection. Medical history is the critical link between allergy test results and allergic disease itself. Although, both blood and skin allergy tests can detect a patient's sensitivity to common inhalants like pollen and dust mites or to medicines, certain foods, latex, venom, or other substances, the allergy skin testing is however the gold standard and is used along with the medical history to establish a diagnosis [39]. If the results of skin and blood allergy tests are not clear or are inconsistent with the patient's medical history,

allergists rely on their training and experience along with a patient's medical history and a physical examination to make the final diagnosis.

Complications of allergy occur when the mucosal lining of an organ is bridged. Associated complications of allergy in this study include otitis media and external, pharyngitis, Injury to the external auditory canal from persistent scratching, foreign body impaction like cotton bud and orbital complications. This finding is similar to the reports in previous study [40].

In the management of the allergic patients, multidisciplinary approach was used in this study. This is due to associated comorbid illnesses and complication of allergy in children. The health team included general practitioner, paediatricians, ophthalmologist, dermatologist and otorhinolaryngologists, head and neck surgeon [23]. The treatments of approach were allergen avoidance, medical intervention and surgical treatment of comorbid illnesses and complications. Allergens control requires aggressive environmental control which is effective [41]. Medical treatment includes antihistamines and intranasal steroid depending on the clinical findings. Surgical therapy is reserved for adequate treatment of comorbid illnesses, complications and refractory to medical treatment [42]. Other form treatments such as Immunotherapy, desensitization are not used in this study due to available facilities in our study center [43].

There is no associated mortality to allergy in children in our findings. Common cause of death due to comorbid illnesses, surgical complications were recorded in other study [44].

Limitation of this study includes inability to performed allergy testing, the study is a hospital based study and measurement of quality of life without the use of standardized and validated (generic or disease-related) questionnaires. Despite these limitations this study provide hospital information which can serve as bases for community based study and may help health care workers to develop guideline in management of allergy in children.

## Conclusion

Allergy is very common and affects ear, nose, throat, head and neck organs. It is usually neglected with late presentation in children. At presentation there were associated comorbid illnesses, complications and affectation of quality of life to the otorhinolaryngologist in majority of the children. Early referral is highly recommended to the specialist to avoid on toward effect. There is urgent need to increase level of awareness and health education of the people on allergy.

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