

Otologic Presentation and Management of Allergic Ear Disorder in a Tropical Developing Country

Waheed Atilade Adegbi¹, Gabriel Toye Olajide², Olawale Olusoga Olubi³, Paul Adebisi Eletta⁴, Emmanuel Abiodun Olusola⁵, Mathew Segun Agboola⁶

¹ENT Department, Ekiti State University Teaching Hospital, Ado Ekiti, Nigeria; ²ENT Department, Federal Teaching Hospital Ido-Ekiti, /Afe-Babalola University Ado-Ekiti (ABUAD), Nigeria; ³ENT Department, Lagos State University Teaching Hospital, Ikeja, Nigeria; ⁴ENT Department, Federal Medical Centre, Bida, Nigeria; ⁵Family Medicine Department, Ekiti State University Teaching Hospital, Ado Ekiti, Nigeria; ⁶Family Medicine Department, Federal Teaching Hospital Ido-Ekiti, /Afe-Babalola University Ado-Ekiti (ABUAD), Nigeria

ABSTRACT

Background: Allergic manifestation in ear is a common unrecognized otologic disorder worldwide. This study aimed at determining the clinicoepidemiologic pattern and management of patients with allergic ear disorder.

Materials and Methods: This was a prospective hospital-based study of patients with clinical diagnosis of allergic ear disorder. Interviewer assisted questionnaire were administered to the consented patient. Data obtained were collated and analyzed using SPSS statistical software version 18.0.

Results: Prevalence of allergic ear disorder in this study was 4.2%. There was 59.8% male with male to female ratio of 1.5:1. No allergen was identified in 7.3%. Common self-reported trigger factor were dirty/earwax, water/Soap and eardrop/body cream in 72.0%, 53.7% and 39.0% respectively. There was family history of allergy in 58.5% of respondents. Common symptoms were pinna pulling/ear picking, ear blockage, hearing impairment and itchy ear in 81.7%, 56.7%, 54.3% and 49.4% respectively. A commonest finding on examination was clean external ear canal 81.7%. Middle ear cleft was the commonest affected part of the ear in 56.7%. A commonest associated comorbid illness was 64.6% allergic rhinitis. Commonest complication recorded was otitis media with effusion in 42.1% respondents. Main quality of life affected were sleep disturbance, depression, changes in mood and general health in 43.9%, 31.7%, 26.8% and 25.6% respectively. Commonest treatment was conservative treatment in 86.6%.

Conclusion: Allergic ear disorder is a common ear, nose and throat disorder affecting all ages. At presentation most cases were associated with comorbid illnesses, complications and impact on quality of life. Early identification and referral of patient to a specialist and prompt treatment to reduce avoidable morbidity is advocated. (*Int J Biomed Sci* 2020; 16 (1): 5-10)

Keywords: Otologic, Allergic ear, Comorbid illnesses, Quality of life, complication

Corresponding author: Dr. Olajide Toye Gabriel, Department of Ear, Nose & Throat, Federal Teaching Hospital, Ido Ekiti, Ekiti State, Nigeria /Afe-Babalola University Ado-Ekiti (ABUAD), Nigeria. Tel: +238034656993; E-mail: olajidetg@abuad.edu.ng

Received February 4, 2020; **Accepted** March 10, 2020

Copyright: © 2020 McNamara et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/2.5/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

BACKGROUND

Allergic affectation of ear is a common otologic disorder in otorhinolaryngological practice. It is an IgE-antigen and mast cell mediated hypersensitivity reaction of the ear lining reaction to the allergens. It is usually insidious in onset which when left untreated may affect the quality of life of the sufferer (1, 2).

Allergy is a global public health problem with various prevalence of up to 20% to 40% worldwide and the trend is known to be on increase (3-5). Prevalence of allergy was found to be 44% in Singaporean school children (6, 7). In UK allergy affects up to 30% of adults and 40% of children at some time in their lives (6, 7). In developing countries like Nigeria prevalence of allergy is not known.

Allergy usually presented with symptoms which may either be perennial or seasonal (8). This depends on the kind of allergen that are responsible for the presenting symptoms (9,10). Allergic disorder is a chronic multi organ disorder which involves inflammation of the mucous membranes of the ear, nose, sinuses, pharynx, larynx, bronchus and eyes in addition to the skin. The allergens include house dust mites, pollen, cat, dog, and molds (11). In early phase response the reaction occur in minutes also called immediate phase response while late phase response occur over 4-8 hours and may persist for hours or days (12-15).

Comorbid illnesses of allergic diseases have been well described in the populations (16,17). Allergic ear disorder may impact on patient health-related quality of life. Poorly controlled symptoms of allergic ear disorder may contribute to learning impairment, decreased overall cognitive functioning and decreased long-term productivity (18,19).

In African, epidemiological data are scarce but the overall prevalence of allergy in children is at least 20% to 24% and there is evidence of increasing prevalence (20-22). This study aimed at determining the clinic-epidemiologic profile and management of allergic ear disorder among patients attending Ekiti state university teaching hospital.

MATERIAL AND METHODS

This was a prospective hospital-based study of patients with clinical diagnosis of allergic ear disorder carried out at ear, nose and throat department of Ekiti state university teaching hospital. The study was carried out over a period of 2 years from May 2016 to April 2018.

Informed consent was obtained from patient/guardian/parent before patients were enrolled into the study.

Interviewer assisted questionnaire were given to the consented patient to obtain information on sociodemographic features and presenting ear complaints such as itching, ear blockage, discharge, hearing impairment and vertigo. Further information on duration, trigger factors and time on allergic ear disorder were also collected. Detailed otorhinolaryngological history was taken from the patient/guardian/parents. Additional history on possible comorbid illnesses, complication and predisposing factor was taken. Past medical, surgical, family and social history were taken. General physical and systemic examination was performed. Thorough nose, ear, throat, head and neck examination were done and findings were documented. Otological examination as in otoscopy and nasal anterior and posterior rhinoscopy was performed.

All the patients were educated based on the findings and on the line of management of ear allergic. Patients were then managed conservatively, medically or combined. Patients were followed up in the ear, nose and throat clinic for three months.

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

Limitation to this study was diagnosis was made clinically and no allergic tests were done. No instrument was used to obtain data on quality of life.

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

RESULTS

During the study period, a total of 3916 patients were seen in ear, nose and throat department. Of these, 164 patients had clinical diagnosis of allergic ear disorder. Thus, the prevalence of allergic ear disorder in this studied population represents 4.2%. All the studied age group had allergic ear disorder. The modal age group was 1-10 years and accounted for 49 (29.9%) of patients. This is demonstrated in Figure 1.

There was male 98 (59.8%) preponderance over female 66 (40.2%). Male to female ratio was 1.5:1. Majority of the patients 148 (90.2%) practices Christianity while 14 (8.5%) were Muslim. No formal and tertiary education level were the commonest educational distribution in 41 (25.0%) and 36 (22.0%) respectively. Other educational levels were primary in 31 (18.9%) and preschool in 29 (17.7%). There were 43 (26.2%) students/apprentice, 28 (17.1%) farmers, 26 (15.9%) business and 24 (14.6%) applicants constituted

the majority of the affected occupation group. Others were teachers in 22 (13.4%) and health workers in 21 (12.8%). Seventy four (45.1%) of the respondents were single while 43 (26.2%) were married. Others were widow and divorced in 28 (17.7%) and 19 (11.6%) respectively. This is illustrated in Table 1.

No allergen was identified in 12 (7.3%) respondents. Common self reported trigger factor were dirty/earwax, water/Soap and eardrop/body cream in 118 (72.0%), 88 (53.7%) and 64 (39.0%) respectively. Other self identify allergens (triggers) were 46 (28.0%) sea/other food. There was family history of allergy in 96 (58.5%) compared to

absence of family history of allergy in 68 (41.5%). This is demonstrated in Table 2. Common ear symptoms in this study were pinna pulling/ear picking, ear blockage, hearing impairment and itchy ear in 132 (81.7%), 93 (56.7%), 89 (54.3%) and 81 (49.4%) respectively. Other less common ear symptoms were vertigo in 3 (1.8%) and water sensation in the ear in 64 (39.0%). This is illustrated in Table 3.

A commonest associated comorbid illness was 106 (64.6%) allergic rhinitis. Others were adenotonsillar disorders, allergic conjunctivitis and asthma in 74 (45.1%), 47 (28.7%) and 27 (16.5%) respectively. This is illustrated in Figure 2. In this study, associated complications were 69 (42.1%) otitis media with effusion, 48 (23.9%) ear foreign body impaction, 42 (25.6%) ear injury and 36 (22.0%) otitis external. Others were meniere’s disease in 2 (1.2%) and chronic suppurative otitis media in 16 (9.8%).

Table 1. Sociodemographic features among the patients (n=164)

Sociodemographic features/ Variable	Frequency (n)	Percentage (%)
Sex		
Male	98	59.8
Female	66	40.2
Religion		
Islam	14	8.5
Christianity	148	90.2
Others	2	1.2
Level of education		
Nil	41	25.0
Pre school	29	17.7
Primary education	31	18.9
Secondary education	27	16.4
Tertiary education	36	22.0
Occupation		
Students/apprentice	43	26.2
Applicant	24	14.6
Business	26	15.9
Teachers	22	13.4
Farming	28	17.1
Health workers	21	12.8
Marital status		
Single	74	45.1
Married	43	26.2
Widow	28	17.1
Divorced	19	11.6

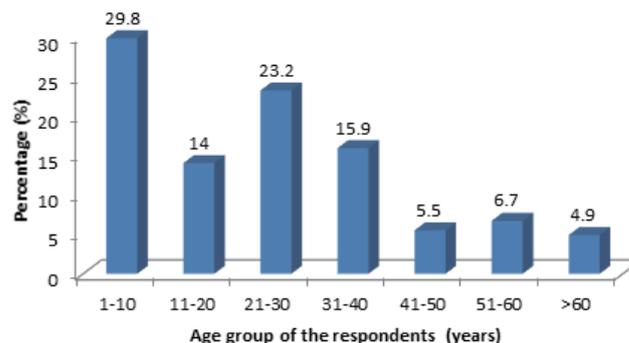


Figure 1. Showing age group of respondents.

Table 2. Allergic features among the patients

Allergic features	Number	Percentage (%)
Triggers factor^a		
Nil	12	7.3
Dirty/earwax	118	72.0
Eardrop/body cream	64	39.0
Sea/other food	46	28.0
Bath water/Soap	88	53.7
Family history		
Present	96	58.5
Absent	68	41.5
Total	164	100.0

^aSome of the patients have more than one trigger factors.

Majority of the studied patients admitted interference with their daily activities. Main quality of life affected includes sleep disturbance, depression, changes in mood and general health which were responsible for 72 (43.9%), 52 (31.7%), 44 (26.8%) and 42 (25.6%) respectively. Less affected quality of life in this study was 29 (17.7%) psychological disorders and 31 (18.9%) anxiety.

In this study, commonest form of treatment was conservative treatment in 142 (86.6%). Other offered treatment were foreign body removal, ear syringing and aural toileting/dressing in 48 (29.3%), 42 (25.6%) and 33 (20.1%) respectively. All the procedures were done in the outpatient clinic. No mortality was recorded in this study population. This is showed in Figure 3.

DISCUSSION

Allergic ear disorder is one of the major health problems in otorhinolaryngological practice and this affecting

all ages worldwide. This has been demonstrated in this study. It has also been documented as a global health challenges (23, 24). In this hospital based study prevalence of ear allergy was found to be 4.2%. This is a lower prevalence compare to recorded prevalence in other allergic study.^{23,24} Low prevalence of allergic ear disorder findings in this study is because majority of patients result to self-medication, herb medication or treated in the peripheral hospitals. Only few complicated cases or those with comorbid illnesses are referred to or present to otorhinolaryngologist. Higher prevalence of allergy have been reported in developed and industrial countries and some part of African countries (24, 25).

Majority of patients with allergic ear disorder in this study were children. This may be due to increased number of children with allergy had associated comorbid illnesses and complications. This situation usually compelled parents to seek medical intervention. The allergic ear disorder in adult are commonly ignored due to ignorant, mild symptoms and uncommon associated upper respiratory tract complications. The findings in this study is different from the record of previous study (26, 27).

There was male preponderance in this study. A similar finding was reported in other study on allergic disorder (28). This finding is contrary to other studies on allergy which reported female predominance (29). Other study of allergic disorder also revealed no gender predilection in their findings (30). Majority of the patients reported feeling of objects in the ear which leads to itchy ear from bath water/soap in the ear. Other findings also revealed ear irritation simultaneously in nose, throat and eye reaction to

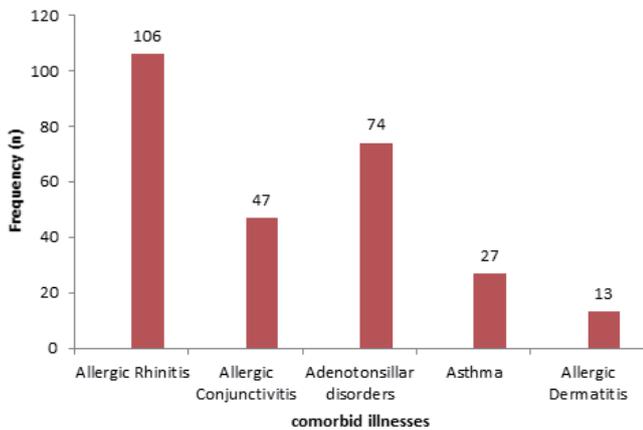


Figure 2. Comorbid illnesses among the respondents.

Table 3. Symptoms among the patients

Symptoms	Frequency (n)	Percentage (%)
Itchy ear	81	49.4
Ear blockage	93	56.7
Hearing impairment	89	54.3
Water sensation in ear	64	39.0
Vertigo	3	1.8
Pinna pulling/ear picking	132	80.5
Others	31	18.9

Some patients have more than one symptoms.

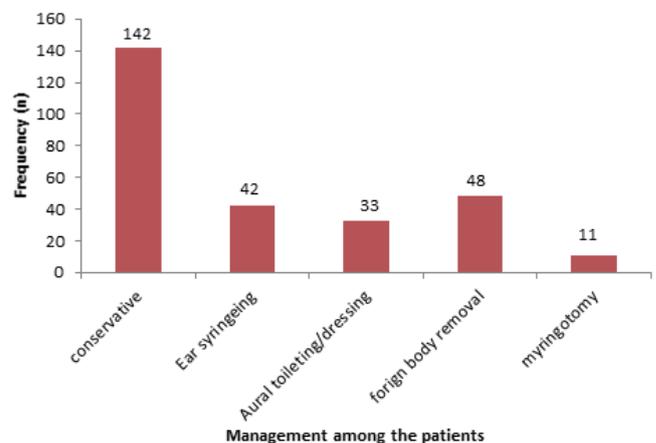


Figure 3. Types of management among the patients.

allergens such as dust, cream, food and eardrop. A similar finding was reported in other study (18).

Allergies are generally due to genetic predisposition and it is responsible for patients to develop allergic ear disorder. There is family history of allergy in our patient in various combinations of asthma, allergic rhinitis and conjunctivitis in most of our study patients. These findings were in agreement with other studies on allergy (31-33). In this study, majority of the patients presented with associated comorbid illnesses like asthma, eczema, sinusitis, conjunctivitis and adenotonsillar disorder. Some studies on allergy reported low incidence of associated comorbid illnesses in their findings (34, 35). Probably because of good environmental control, different genetic component, prompt treatment and early medical intervention of allergic disorder.

Complications in allergic ear disorder occur from poorly controlled, non-treated long standing allergy or when it is associated with superimposed infection (viral, bacterial or fungal). This leads to the development of other disease such as otitis media, otitis media with effusion, hearing impairment, orbital complications, sinusitis, nasal polyps, abnormal craniofacial development and obstructive sleep apnea (36). Affected quality of life in the studied patients includes: disrupt sleep, interference with daily activities, psychological disorders, social dysfunction, changes in mood, depression, anxiety, fatigue, and sexual dysfunction. This observation was also noted in other allergic study (37).

Management of allergic ear disorder may require multidisciplinary approach for effective treatment outcome. This is because of associated comorbid illnesses, complications and impact on quality of life. The specialist management team includes otorhinolaryngologists, radiologist, paediatricians, psychiatrist, family physician and allergists (38). The treatment of allergy consists of allergen avoidance (aggressive environmental control) which is effective but practically difficult (38). In addition to this; medical treatment using steroids and antihistamines are also administered. Surgical therapy is reserved for complicated and comorbid illnesses. Conservative treatment in this study was done on all symptomatic patients using avoidance of allergens with antihistamines and steroid nasal spray which temporarily relief patient symptoms. This therapy is in line with treatment in other study (38). Majority of the patients had clinic minor procedure because of associated complications and comorbid illnesses. This finding was similar to the observation in other study (39). It is paramount for patients to know that all these treat-

ment cannot cure allergic ear disorder. This is a major concern to patient/guardian/parent. In this study all patient noticed improvement at first week follow up visit. No death was recorded in this study on account of allergic ear disorder.

Allergic ear disorder is a common otologic disorder with under presentation among patients seen by Otorhinolaryngologist. Many patients had associated comorbid illnesses, complications and impact quality of life. Many of the patients were conservatively managed by emphasis on avoidance of triggers factor, prompt presentation and early referral to the Otorhinolaryngologist to avoid on toward outcome. It is therefore recommended that public enlightenment, further local and national study on allergic ear disorder in Nigeria is necessary.

FUNDING

There was no financial support. It was a self-sponsored research study.

CONFLICT OF INTEREST

The authors declare that no conflicting interests exist.

ACKNOWLEDGEMENTS

The authors are most grateful to Ekiti state university teaching hospital and all the patients who participated in this study.

REFERENCES

1. Schmitz R, Thamm M, Ellert U, Kalcklösch M, *et al.* Verbreitung häufiger Allergien bei Kindern und Jugendlichen in Deutschland: Ergebnisse der KiGGS-Studie-Erste Folgebefragung (KiGGS Welle 1) Bundesgesundheitsbl Gesundheitsforsch Gesundheitsschutz. 2014; 57: 771-778.
2. Schmitz R, Ellert U, Thamm M. Erkrankungsbedingte Fehlzeiten und Lebensqualität von Kindern und Jugendlichen mit atopischen Erkrankungen in Deutschland - Ergebnisse der KiGGS-Studie. 8. Deutscher Allergiekongress. 5.-7. September 2013, Bochum. *Allergo J.* 2013; 6: 390-391.
3. Wu WF, Wan KS, Wang SJ, *et al.* Prevalence, severity, and time trends of allergic conditions in 6-to-7-year-old schoolchildren in Taipei. *J. Investig Allergol Clin. Immunol.* 2011; 21: 556.
4. Mims JW. Epidemiology of allergic rhinitis. *Int Forum Allergy Rhinol.* 2014; 4 (2): S18-20.
5. Singh K, Axelrod S, Bielory L. The epidemiology of ocular and nasal allergy in the United States, 1988-1994. *J. Allergy Clin. Immunol.* 2010; 126: 778.
6. Meltzer EO, Bukstein DA. The economic impact of allergic rhinitis and current guidelines for treatment. *Ann. Allergy Asthma Immunol.*

- 2011; 106: S12-16.
7. Mallol J, Crane J, von Mutius E, *et al.* The International Study of Asthma and Allergies in Childhood (ISAAC) Phase Three: a global synthesis. *Allergol Immunopathol (Madr)*. 2013; 41: 73.
 8. Bousquet J, Van Cauwenberge P, Khaltaev N. Aria Workshop Group; World Health Organization. Allergic rhinitis and its impact on asthma. *J. Allergy Clin. Immunol.* 2001; 108: S147–S334.
 9. Dhong HJ. Classification of Allergic Rhinitis: What is Most Suitable in Korea? *Allergy Asthma Immunol Res.* 2013; 5 (2): 65-67.
 10. Bousquet J, Schönemann HJ, Samolinski B, Demoly P, *et al.* World Health Organization Collaborating Center for Asthma and Rhinitis. Allergic Rhinitis and its Impact on Asthma (ARIA): achievements in 10 years and future needs. *J. Allergy Clin. Immunol.* 2012; 130: 1049–1062.
 11. Lim MY, Leong JL. Allergic rhinitis: evidence-based practice. *Singapore Med. J.* 2010; 51 (7): 542-550.
 12. Broide DH. Allergic rhinitis: pathophysiology. *Allergy Asthma Proc.* 2010; 31: 370-374.
 13. Osguthorpe JD. Pathophysiology of and potential new therapies for allergic rhinitis. *Int. Forum Allergy Rhinol.* 2012 Nov 28 [Epub ahead of print].
 14. Pagani D, Galliera E, Dogliotti G, De Bernardi di Valserra M, *et al.* Carbon Dioxide-enriched Water Inhalation in Patients with Allergic Rhinitis and its Relationship with Nasal Fluid Cytokine/Chemokine Release. *Archives of Medical Research.* 2011; 42 (4): 329-333.
 15. Cokic SM, Hoet P, Godderis L, Wiemann M, *et al.* Cytotoxic effects of composite dust on human bronchial epithelial cells. *Dental Materials.* 2016; 32 (12): 1482-1491.
 16. Meltzer EO, Blaiss MS, Derebery MJ, Mahr TA, *et al.* Burden of allergic rhinitis: results from the Pediatric Allergies in America survey. *J. Allergy Clin. Immunol.* 2009; 124 (3): S43–S70.
 17. Rondon C, Romero JJ, Lopez S, Antunez C, *et al.* Local IgE production and positive nasal provocation test in patients with persistent nonallergic rhinitis. *J. Allergy Clin. Immunol.* 2007; 119: 899–905.
 18. Okuda M, Ohkubo K, Goto M, Okamoto H, *et al.* Comparative study of two Japanese rhinoconjunctivitis quality-of-life questionnaires. *Acta Otolaryngol.* 2005; 125: 736–744.
 19. Léger D, Annesi-Maesano I, Carat F, Rugina M, *et al.* Allergic rhinitis and its consequences on quality of sleep: an unexplored area. *Arch. Intern Med.* 2006; 166: 1744–1748.
 20. Obeng BB, Hartgers F, Boakye D, Yazdanbakhsh M. Out of Africa: what can be learned from the studies of allergic disorders in Africa and Africans?. *Curr. Opin. Allergy Clin. Immunol.* 2008; 85: 391-397.
 21. Mercer MJ, Van der Linde GP, Joubert G. Rhinitis (allergic and non-allergic) in an atopic pediatric referral population in the grasslands of inland South Africa. *Ann. Allergy Asthma Immunol.* 2002; 89 (5): 503-512.
 22. Takwoingi Y, Akang E, Nwaorgu G, Nwawolo C. Comparing nasal secretion eosinophil count with skin sensitivity test in allergic rhinitis in Ibadan, Nigeria. *Acta. Otolaryngol.* 2003; 23 (9): 1070-1074.
 23. Salo PM, Calatroni A, Gergen PJ, Hoppen JA, *et al.* Allergy-related outcomes in relation to serum IgE: results from the National Health and Nutrition Examination Survey 2005-2006. *J. Allergy Clin. Immunol.* 2011; 127: 1226-35.e7.
 24. Hardjojo A, Shek LP, Van Bever HP, Lee BW. Rhinitis in children less than 6 years of age: current knowledge and challenges. *Asia Pac. Allergy.* 2011; 1 (3): 115-122.
 25. Desalu OO, Salami AK, Iseh KR, Oluboyo PO. Prevalence of self reported allergic rhinitis and its relationship with asthma among adult Nigerians. *J. Investig Allergol Clin. Immunol.* 2009; 9 (6): 474-480.
 26. Masuda S, Fujisawa T, Katsumata H, Atsuta J, *et al.* High prevalence and young onset of allergic rhinitis in children with bronchial asthma. *Pediatr Allergy Immunol.* 2008; 19 (6): 517-522.
 27. Osman M, Hansell AL, Simpson CR, Hollowell J, *et al.* Gender-specific presentations for asthma, allergic rhinitis and eczema in primary care. *Prim Care Respir J.* 2007; 16 (1): 28-35.
 28. Alsowaidi S, Abdulle A, Bernsen R, Zuberbier T. Allergic rhinitis and asthma: a large cross-sectional study in the United Arab Emirates. *Int. Arch. Allergy Immunol.* 2011; 153 (3): 274-279.
 29. Borges WG, Burns DA, Felizola ML, Oliveira BA, *et al.* Prevalence of allergic rhinitis among adolescents from Distrito Federal, Brazil: comparison between ISAAC phases I and III. *J. Pediatr (Rio J).* 2006; 2 (2): 137-143.
 30. Gathiru C, Macharia I. The prevalence of allergic rhinitis in college students at Kenya Medical Training College-Nairobi, Kenya. *World Allergy Organization Journal.* 2007; S84-S85.
 31. Nurliza I, Norzi G, Azlina A, Hashimah I, *et al.* Daycare tonsillectomy: a safe outpatient procedure. Hospital Sultanah Bahiyah, Alor Setar Malaysia experience. *Med. J. Malaysia.* 2011; 66 (5): 474-478.
 32. Rondon C, Fernandez J, Canto G, Blanca M. Local allergic rhinitis: concept, clinical manifestations, and diagnostic approach. *J. Investig Allergol Clin. Immunol.* 2010; 20 (5): 364-371.
 33. Kurukulaarachy RJ, Karmaus W, Raza A, Matthews S, *et al.* The influence of gender and atopy on the natural history of rhinitis in the first 18 years of life. *Clin. Exp. Allergy.* 2011; 41: 851–859.
 34. Suh M, Kim HH, Sohn MH, Kim KE, *et al.* Prevalence of allergic diseases among Korean school-age children: a nationwide cross-sectional questionnaire study. *J. Korean Med. Sci.* 2011; 26 (3): 332–338.
 35. Zheng T, Yu J, Oh MH, Zhu Z. The atopic march: progression from atopic dermatitis to allergic rhinitis and asthma. *Allergy Asthma Immunol Res.* 2011; 3 (2): 67–73.
 36. Mbata GC, Chukwuka JC. Obstructive sleep apnea hypopnea syndrome. *Ann Med Health Sci Res.* 2012; 2: 74-77.
 37. Kim JH, Ahn YM, Kim HJ, Lim DH, *et al.* Development of a questionnaire for the assessment of quality of life in Korean children with allergic rhinitis. *Allergy Asthma Immunol Res.* 2014; 6: 541–547.
 38. Lee S. Practical clinical approaches to the allergic rhinitis patient. *Int. Forum Allergy Rhinol.* 2014; 4 (2): S66-69.
 39. Hon KL, Fung CK, Leung AK, Lam HS, *et al.* Recent Patents of Complementary and Alternative Medicine for Allergic Rhinitis. *Recent Pat Inflamm Allergy Drug Discov.* 2015; 9 (2): 107-119.