INTRODUCTION

Chronic rhino sinusitis (CRS) has been the second most prevalent chronic health problem, affecting 12.5% of the US population or nearly 31 million patients each year. Sinusitis in children is one of the less-recognised clinical findings. Although many physicians believe that sinusitis can affect children of any age, but at the same time the best strategies for treatment and diagnosis in children is still controversial. High incidence of sinusitis beside the increasing microbial resistance against the old-generation antibiotics shows the need for proper diagnostic and therapeutic measures in these children.

The real prevalence of sinusitis in children is unknown but it seems that in average each child is affected by the upper respiratory tract infections for six to seven times per year and sinusitis occurs in 5-13% of them. Approximately, 6-13% of children may experience sinusitis. Also, according to the studies, incidence of sinusitis and microbial resistance is high, causing an increase in health care costs.

There are several predisposing factors in sinusitis including inflammatory, anatomic and immunological factors. Allergic rhinitis is the most common predisposing factor for rhino sinusitis. The incidence of allergy in children is estimated as 15-20%. Patients afflicted with allergies have a predisposition for developing sinusitis. One study determined that both disorders exist in the same patient 25-70% of the time, and another study found that 72 of 121 patients with chronic nasal symptoms and positive skin tests for allergies had positive sinus computed tomography scans showing sinusitis.

To our knowledge, the accurate information about the prevalence of chronic or recurrent sinusitis in Northwest of Iran is not available, and considering the cold and dry climate and the increasing presence of children in kindergarten, it seems that the prevalence of viral respiratory tract infections and consequently the purulent...
sinusitis is high in this region. On the other hand, there are many controversies in diagnostic criteria and treatment of CRS, and some doctors are not fully familiar with this disease in children. Meanwhile, the mentioned problems is increasing in the simultaneous presence of sinusitis and inflammation of other parts of the upper or lower respiratory tract. So the present study was designed to conduct a survey on the chronic or recurrent sinusitis in this region to determine the risk factors and the role of allergy in response to treatment.

MATERIALS AND METHODS

This study was performed on 106 children with chronic or recurrent sinusitis presenting to Paediatric Clinic of Tabriz University of Medical Sciences or Allergy or Ear-Nose-Throat (ENT) clinics of "Tabriz Children Educational-Medical centre" since 2010 to 2012. Inclusion criteria were children or teenagers with diagnosis of chronic or recurrent sinusitis according to guidelines of American Academy of Otolaryngology, Head and Neck Surgery. Exclusion criteria were patients with concurrent head and neck problems and age more than 18 years.

The Tabriz University of Medical Sciences Ethical Committee permission was obtained before performing the study, and the informed consent was obtained from patients. Then, the patient enrolled for visit and evaluation by researchers, and information about the history and physical examination were included in the checklist. The patients were evaluated about underlying causes of allergies, cystic fibrosis, immunodeficiency and reflux, and finally, the prevalence of children with allergies has been determined.

Baseline variables including patients’ age, sex and location of the patients (in urban and rural environments) were recorded. The history of exposures with environments that have allergic capability, living in places near the garden or arable land and proximity to the factories, workshops or chemical waste, exposure to pets, kindergarten attendance, history of exposure with tobacco smoke and history of the feeding with cow milk were asked and recorded. Family history of allergies including skin allergies, allergic rhinitis, asthma and eye allergies were also asked. Previous history of allergy including rhinitis, asthma, ocular allergy, eczema and wheal were recorded in allergic patients.

Also, the studied cases were assessed about: History of allergy-related disease including recurrent colds and flu or prolonged colds, long-term use of antibiotics, recurrent purulent pharyngitis, recurrent acute otitis, history of recurrent serous otitis or prolonged infections and recurrent infection croup history of chronic cough, mouth breathing, nocturnal snoring and nocturnal apnoea, history of continuous nasal congestion, purulent rhinorrhea or postnasal pharyngeal discharge. In addition, the information of patients were evaluated and recorded for a history of nasal itching, sneezing, halitosis, throat pruritus, nasal speech, hot potato voice, ear pruritus, autophony, tinnitus, otorrhea, hearing loss, wheezing, cough following physical activity and epigastric burning.

Clinical examination of the ear, throat, nose and lungs was also performed and their positive or negative findings were recorded as the “have” or “doesn’t have”, respectively. Skin sensitivity test was performed for all patients and positive test cases for each patient were recorded and the total number of positive allergy tests for each patient was calculated and recorded.

Treatment modalities were antibiotic therapy, antihistamines, topical corticosteroids, systemic steroids and surgery. The surgery methods were included the insertion of ventilation tubes (VT), adenoidectomy, tonsillectomy and sinus surgery which were recorded in patients data form. Response to treatment was assessed in follow-up visits for each patient and was recorded as “Better”, “Worse” and “No change”. Being better was considered as the decline in the frequency of colds and the need for antibiotics and consequently reducing the symptoms of chronic sinusitis and recurrent sinusitis.

The collected data and variables were described using descriptive statistics, frequency and percentage. Statistical analyses of data were performed by Statistical Package for the Social Sciences (SPSS)-16 software using Chi-square test, Fisher’s exact test, independent T-test and Pearson’s correlation coefficient. P values less than 0.05 were considered statistically significant.

RESULTS

The average age of patients was 6.5 ± 2.9 years (range: 6 months to 18 years). 54 (50.9%) patients was male and 52 (49.1%) were female. Eighty-three patients (78.3%) were living in cities and 22 (20.8%) were from rural areas. According to patients’ history, 35 patients (33.0%) were living in vicinity of a garden or arable land. Five patients were living in the neighbourhood of factories or chemical wastes. Also, there was a history of exposure to pets in 27 patients (25.5%), attending in kindergarten for 52 patients (49.1%) and smoking in 57 (53.8%), and a history of feeding with cow milk was noted for 17 patients (16.0%).

The numbers and percentages of positive cases for family history of allergies and previous history of allergy in patients and the history of allergy-related disease and chronic cough, mouth breathing, nocturnal snoring and nocturnal apnoea are shown in Table 1.

The history of nasal obstruction was reported by 87 patients (82%) of which the obstruction was repeatedly in 77 patients...
Clinical examination revealed postnasal discharge (PND) in 20 patients, pharyngeal findings including erythema and exudate in 73 patients and pulmonary findings including wheezing in 5 patients.

Skin sensitivity test was positive in 74 patients (69.8%). This test was positive for 38 males (70.4%) and 36 females (69.2%). In patients with positive allergy test result, the average number of allergy to allergens was 4.6 ± 3.2 with (range: 1-12). This number in male and female patients was 5.1 ± 3.4 and 1.4 ± 2.8 with (range: 1-12 to 1-10).

The numbers and percentages of positive cases for each allergen are shown in Table 3 and Table 4 shows the treatment modalities used in studied patients.

Treatment of chronic sinusitis or recurrent administration caused to improvement and recovery in 92 patients (86.8%). Eight patients (7.5%) did not improve significantly. None of the patients have reported a worse condition after treatment of chronic sinusitis or recurrent in comparison with the time before receiving allergy treatment.

There was a significant improvement among 48 male patients (94.1%) and 44 female patients (89.8%). Chi-square test showed no significant difference in cure rate of chronic sinusitis or recurrent after treatment of allergy in two male and female genders (P > 0.05).

Also Table 4 shows the response to various treatment modalities used in studied patients.

The square tests showed that taking antihistamines (P=0.002) and topical corticosteroids (P=0.011) for chronic or recurrent sinusitis was effective in the recession of the symptoms while antibiotics and surgery were not as effective.

Analysis by chi-square test did not revealed any significant relationship between improvement or no improvement and presence of clinical finding including ear, throat, nose and pulmonary symptoms (P > 0.05).

Pearson’s correlation coefficient revealed a significant correlation between positive allergy test results and the age of patients (P < 0.001); so, the less age the patients were associated with more positive allergy cases (r = −0.13). In other words, there is a reverse relation between aging and positive allergy cases [Figure 1].

**DISCUSSION**

This study, performed on 106 children with chronic or recurrent sinusitis, showed that the skin sensitivity test was positive in 69.8% of the cases. This test was positive in 70.4% of males and 69.2% of females. Histamine test was positive in all patients. This overlap between allergy and
chronic or recurrent sinusitis in this study is compatible with findings of previous studies.\textsuperscript{15-17}

Although anatomic variants have been suggested to predispose to obstruction of the ostiomeatal unit and development of chronic rhinosinusitis (CRS), however, recent studies in a pediatric population found no correlation between anatomic abnormalities and the extent of CRS on sinus imaging.\textsuperscript{18}

Smart and Slavin,\textsuperscript{19} Pawankar and Zernotti\textsuperscript{16} and Pearlman \textit{et al.}\textsuperscript{20} suggested the relationship between asthma and risk of CRS. Ragab \textit{et al.}\textsuperscript{21} have also found a correlation of CRS and upper respiratory tract disease including asthma.

The pathophysiological correlation of CRS and allergic and inflammatory reactions is controversial. Pearlman believe that CRS is an inflammatory disease that occurs independent of IgE-related pathways\textsuperscript{20} while Kirtsreesakul and Ruttanaphol\textsuperscript{22} consider a relation between allergic rhinitis and CRS as an IgE-mediated hypersensitivity. Jouaville \textit{et al.} have also found a degree of inflammation in the pathophysiology of rhinitis revealed by study of expiratory nitric oxide, indicating a significant overlap with allergic disease including asthma and atopy.\textsuperscript{23} The prevalence of IgE-mediated allergy to environmental allergens in patients with CRS has been estimated at 60% or nearly twofold of the general population.\textsuperscript{1} Liou \textit{et al.} evaluated causes and contributive factors to asthma severity in asthmatic patients and suggested that CRS was associated with more severe asthma.\textsuperscript{24}

Analysis of response to therapy showed improvement in 86.8% and no change in 7.5% of patients. As a treatment

\begin{table}[h]
\centering
\begin{tabular}{|l|c|c|c|}
\hline
Allergens & Total positive cases & Positive cases in boys & Positive cases in girls \\
\hline Tress mix & 38 (35.8) & 19 (35.2) & 19 (36.5) \\
Grass mix & 37 (34.9) & 22 (40.7) & 15 (28.8) \\
Acacia & 1 (0.9) & 1 (1.9) & - \\
Alder pollen & 6 (5.7) & 4 (7.4) & 2 (3.8) \\
Molds & 6 (5.7) & 4 (7.4) & 2 (3.8) \\
Latex & 1 (0.9) & - & 1 (1.9) \\
Cat & 13 (12.3) & 10 (18.5) & 3 (5.8) \\
Feather & 10 (9.4) & 7 (13) & 3 (5.8) \\
Sheep wool & 1 (0.9) & - & 1 (1.9) \\
Mite 1 (d. p) & 25 (23.6) & 16 (29.6) & 9 (17.3) \\
Mite 2 (d. f) & 20 (18.9) & 14 (25.9) & 6 (11.5) \\
Aspergillus Fumigatus & 11 (10.4) & 8 (14.8) & 3 (5.8) \\
Soya & 1 (0.9) & - & 1 (1.9) \\
Cocoa & 18 (17.0) & 9 (16.7) & 9 (17.3) \\
Melon & 22 (20.8) & 12 (22.2) & 10 (19.2) \\
Onion & 4 (3.8) & 1 (1.9) & 3 (5.8) \\
Almond & 26 (24.5) & 12 (22.2) & 14 (26.9) \\
Cow’s milk & 3 (2.8) & 1 (1.9) & 2 (3.8) \\
Egg (whole) & 12 (11.3) & 8 (14.8) & 4 (7.7) \\
Orange & 2 (1.9) & 1 (1.9) & 1 (1.9) \\
Kiwi & 14 (13.2) & 8 (14.8) & 6 (11.5) \\
Banana & 17 (16) & 10 (18.5) & 7 (13.5) \\
Apple & 3 (2.8) & 2 (3.7) & 1 (1.9) \\
Walnut & 2 (1.9) & - & 2 (3.8) \\
Tomato & 28 (26.4) & 17 (31.3) & 11 (21.2) \\
Wheat flour & 7 (6.6) & 2 (3.7) & 5 (9.6) \\
\hline
\end{tabular}
\caption{Frequency of allergens in studied patients}
\end{table}

\begin{table}[h]
\centering
\begin{tabular}{|l|c|c|c|c|}
\hline
Therapeutic & Total & Male & Female & Improvement & \(P\) \\
\hline Antibiotic & 104 (98.1) & 54 (100) & 50 (96.2) & 90 (91.8) & >0.05 \\
Antihistamines & 85 (80.2) & 43 (79) & 42 (80.8) & 77 (95.1) & <0.05 \\
Topical corticosteroids & 70 (66) & 37 (68.5) & 33 (63.5) & 64 (97.0) & <0.05 \\
Systemic corticosteroids & 33 (31.2) & 15 (27.8) & 18 (34.6) & 28 (87.5) & >0.05 \\
Surgery & 23 (22.2) & 10 (18.5) & 13 (25) & 18 (34.6) & >0.05 \\
Type of Surgery & VT1 & 2 (1.9) & 1 (1.9) & 1 (1.9) & - \\
Adenoidectomy & 33 (31.2) & 15 (27.8) & 18 (34.6) & - & - \\
Tonsilectomy & 23 (22.2) & 10 (18.5) & 13 (25) & - & - \\
Sinus surgery & 0 (0) & 0 (0) & 0 (0) & - & - \\
\hline
\end{tabular}
\caption{Treatment modalities used in studied patients}
\end{table}
The present study showed that anti-allergic treatment is more effective in patients with chronic or recurrent sinusitis in whom the skin allergy test is positive (including both positive test result and number of positive results). These findings which are compatible with Lavigne et al. study is showing the importance of anti-allergic therapy in the treatment of children with chronic or recurrent sinusitis.

The theory of “united allergic airway” connects allergic rhinitis (AR), CRS and asthma are viewed as arising from a common atopic entity. The aggregation of research suggests that AR, asthma and chronic rhinosinusitis are linked by the united allergic airway, a notion that encompasses commonalities in pathophysiology, epidemiology and treatment.

However, despite the common thought, considering the overlap between allergic reactions and rhinosinusitis, Gelincik et al. suggested that allergic and non-allergic rhinitis may predispose the patient similarly to the CRS. According their findings, allergic and non-allergic rhinitis are similar in symptoms of rhinosinusitis, including pharyngeal secretions, dental pain, diagnostic grading, except for purulent nasal discharge which is more in allergic rhinitis. It must be mentioned that the findings of this research and other studies which indicate an overlap between allergic diseases and chronic rhinosinusitis do not have a conflict and in conclusion, inflammatory reactions in upper and lower respiratory tract are pathologically related with the chronic and recurrent sinusitis, and this correlation is confirmed by clinical findings. However, the overlap of upper and lower respiratory tract allergic disease with the chronic and recurrent sinusitis is of greater importance because successful treatment of allergic diseases in children with chronic or recurrent sinusitis, increases the therapeutic response and reduces the treatment cost.

Epidemiological evidence suggests a strong relationship between AR and asthma. AR and asthma, rather than being considered two distinct diseases, can be unified by the concept of a “united airway” where allergic symptoms of the upper and lower airways can be thought of as manifestations of a common atopic entity. Both diseases, which are IgE mediated, can be triggered by similar allergens. In addition to the epidemiological evidence, several clinical reports point to a common pathophysiological relationship between AR and asthma.

The overlap between allergic and non-allergic rhinitis with chronic sinusitis has been described by other studies and as the Gelincik showed more nasal purulence in allergic patients, Kirtsreesakul and Ruttanaphol showed more abnormal findings in sinus radiography of patients with allergic rhinitis, in comparison with non-allergic rhinosinusitis patients. Also, it has shown more endoscopic findings in patients with chronic non-allergic rhinosinusitis than allergic rhinosinusitis patients. It can be concluded that because patients with chronic allergic rhinosinusitis have more purulent nasal secretions than non-allergic rhinosinusitis patients, probably the pyogemous pathogens are more colonised in para-nasal sinuses of these patients causing destructive effects and consequently more radiographic findings in their sinuses.

According to previous studies, because of the relation between cold and allergic reactions, treatment of allergy, reduces the frequency of catching cold and the need for antibiotics and is effective on treatment of chronic or recurrent sinusitis. This relationship is also confirmed by the present study.

CONCLUSION

Allergic diseases in children with chronic or recurrent sinusitis are remarkably common and are associated with a large number of positive skin allergy tests. Treatment of allergic disease in children with chronic or recurrent sinusitis improve the patients’ condition. This improvement reduces the frequency of catching colds and the need for antibiotics. Also the symptoms of sinusitis are reduced by reducing the frequency of colds. This may be because of probable effect of cold viruses on provoking allergic sinusitis. The response to therapy is higher in patients with positive allergy test. Aging reduces the allergic reaction and the positive allergy skin test. Age is one of the major effective factors in the treatment of allergies and subsequently in the treatment of recurrent and chronic sinusitis in children.

REFERENCES

1. Hamilos DL. Chronic rhinosinusitis: Epidemiology and medical management. J Allergy Clin Immunol 2011;128:693-707.
2. Pleis JR, Lucas JW, Ward BW. Summary health statistics for US adults: National Health Interview Survey, 2008. Vital and health statistics Series 10, Data from the National Health Survey. 2009(242):1.
3. Zacharisen M, Casper R. Pediatric sinusitis. Immunol Allergy Clin North Am 2005;25:313-32.
4. Saleh P, Bastani P, Piri R, Goldust M, Naghavi-Bezhad M, Antimicrobial prophylaxis for surgical site infections in surgical wards in northwest Iran. Life Sci J 2013;10:1977-81.

5. Varshochi M, Kianmehr P, Naghavi-Bezhad M, Bayat-Makoo Z. Correspondence between hospital admission and the pneumonia severity index (PSI), CURB 65 criteria and comparison of their predictive value in mortality and hospital stay. Infezioni in Medicina 2013;21:103-10.

6. Oxford LE, McClay J. Complications of acute sinusitis in children. Otolaryngol Head Neck Surg 2005;133:32-7.

7. Chonmaitree T, Revai K, Grady JJ, Clos A, Patel JA, Nair S, 6. Oxford LE, McClay J. Complications of acute sinusitis in children. Otolaryngol Head Neck Surg 2005;133:32-7.

8. Saleh P, Bastani P, Piri R, Goldust M, Naghavi-Bezhad M, Antimicrobial prophylaxis for surgical site infections in surgical wards in northwest Iran. Life Sci J 2013;10:1977-81.

9. Ray NF, Baraniuk JN, Thamer M, Rinehart CS, Gergen PJ, McCaig LF, Besser RE, Hughes JM. Trends in antimicrobial prophylaxis for surgical site infections in surgical wards in northwest Iran. Life Sci J 2013;10:1977-81.

10. Rosenfeld RM, Andes D, Bhattacharyya N, Cheung D, Eisenberg S, Ganiats TG, American Academy of Allergy, Asthma and Immunology, Joint Council of Allergy, Asthma and Immunology, J Allergy Clin Immunol 1999;103:408-14.

11. Slavin RG, Sporer SL, Bernstein IL, Kaliner MA, Kennedy DW, Virant FS, American Academy of Allergy, Asthma and Immunology, American College of Allergy, Asthma and Immunology, Joint Council of Allergy, Asthma and Immunology. The diagnosis and management of sinusitis: A practice parameter update. J Allergy Clin Immunol 2005;116:S13-47.

12. Steele RW. Chronic sinusitis in children. Clin Pediatr (Phila) 2006;44:465-71.

13. Hosseini MB, Heidarzadeh M, Balila M, Ghajozaideh M, Janani R, Safavi-nia S, et al. Randomized controlled trial of two methods of nasal continuous positive airway pressure (N-CPAP) in preterm infants with respiratory distress syndrome: underwater bubbly CPAP vs. Medijet system device. Turk J Pediatr 2012;54:632-40.

14. Feng CH, Miller MD, Simon RA. The united allergic airway: Connections between allergic rhinitis, asthma, and chronic sinusitis. Am J Rhinol Allergy 2012;26:187-90.

15. Ciprandi G, Tosca MA, Pasce L. Allergic children have more numerous and severe respiratory infections than non-allergic children. Pediatr Allergy Immunol 2006;17:89-91.

16. Pawankar R, Zernotti ME. Rhinosinusitis in children with asthma and allergy severity. Curr Opin Allergy Clin Immunol 2009;9:151-3.

17. Zacharek MA, Krouse JH. The role of allergy in chronic rhinosinusitis. Curr Opin Otolaryngol Head Neck Surg 2003;11:198-200.

18. Al-Gudah M. The relationship between anatomical variations of the sino-nasal region and chronic sinusitis extension in children. Int J Pediatr Otorhinolaryngol 2008;72:817-21.

19. Smart BA, Slavin RG. Rhinosinusitis and pediatric asthma. Immunol Allergy Clin North Am 2005;25:67-82.

20. Pearlmam AN, Chandra RK, Chang D, Conley DB, Tripathi-Peters A, Grammer LC, et al. Relationships between severity of chronic rhinosinusitis and nasal polyposis, asthma, and atopy. Am J Rhinol Allergy 2009;23:145-8.

21. Ragab A, Clement P, Vincken W. Objective assessment of lower airway involvement in chronic rhinosinusitis. Am J Rhinol 2004;18:15-21.

22. Kirtreesaksul V, Ruttanaphol S. The relationship between allergy and rhinosinusitis. Rhinology 2008;46:204-8.

23. Jouville L, Annesi-Maesano I, Nguyen L, Bocage A, Bedu M, Cailaud D. Interrelationships among asthma, atopy, rhinitis and exhaled nitric oxide in a population-based sample of children. Clin Exp Allergy 2003;33:1506-11.

24. Liu A, Grubb JR, Schechtman KB, Hamilos DL. Causative and contributive factors to asthma severity and patterns of medication use in patients seeking specialized asthma care. CHEST 2003;124:1781-8.

25. Lavigne F, Nguyen CT, Cameron L, Hamid Q, Renzi PM. Prognosis and prediction of response to surgery in allergic patients with chronic sinusitis. J Allergy Clin Immunol 2000;105:746-51.

26. Gelincik A, Büyüköztürk S, Aşlan I, Aydın S, Özseker F, Çolakoğlu B, et al. Allergic vs nonallergic rhinitis: Which is more predisposing to chronic rhinosinusitis? Ann Allergy Asthma Immunol 2008;101:18-22.

27. Nemat B, Ahadi A. Survey of outcome of asthmatic children referred to outpatient clinic of Tabriz University of Medical Sciences. Pak J Biol Sci 2008;11:1860-3.

28. Guerra S, Serrill DL, Martinez FD, Barbee RA. Rhinitis as an independent risk factor for adult-onset asthma. J Allergy Clin Immunol 2002;109:419-25.

29. Marple BF. Allergic rhinitis and inflammatory airway disease: Interactions within the unified airspace. Am J Rhinol Allergy 2010;24:249-54.

30. 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:S147-334.

31. Ciprandi G, Cinillo I, Tosca MA, Vizzaccaro A. Bronchial hyperreactivity and spirometric impairment in patients with perennial allergic rhinitis. Int Arch Allergy Immunol 2004;133:14-8.

32. Chan Y, Kuhn FA. An update on the classifications, diagnosis, and treatment of rhinosinusitis. Curr Opin Otolaryngol Head Neck Surg 2009;17:204-8.

33. Akbarzadeh F, Shadravan S, Ghorbanian M, Piri R, Naghavi-Bezhad M. Double Left Anterior Descending Coronary Artery Originating from Left Main Coronary Stem and Right Coronary Artery. Journal of Cardiovascular and Thoracic Research. 2013;5:73-5.

34. Mullol J. Trends on rhinosinusitis diagnosis and treatment. Otolaryngol Pol 2009;63:3-4.

35. Pant H, Ferguson BJ, Macardie PJ. The role of allergy in rhinosinusitis. Curr Opin Otolaryngol Head Neck Surg 2009;17:232-8.

36. Ryan MW. Diseases associated with chronic rhinosinusitis: What is the significance? Curr Opin Otolaryngol Head Neck Surg 2008;16:231-6.

37. Abdollahi M, Mozibian M, Pishgahi A, Mallah F, Dareshiri S, Mohammadi S, et al. Intravenous paracetamol versus intramuscular pethidine in relief of labour pain in primigravid women. Niger Med J 2014;55:54-7.

38. Shams-Vahdati S, Vand-Rajavpour Z, Paknezhad SP, Piri R, Moghadasi-Ghezeljeh E, Mirabolafshi S, et al. Cost-Effectiveness of Cardiac Biomarkers as Screening Test in Acute Chest Pain. J Cardiovasc Thorac Res 2014;6:29-33.

How to cite this article: Abdollahi-Fakhim S, Sadeghi-Shabestari M, Abdollahi-Agdas M, Naghavi-Bezhad M, Alikhah H. Medical treatment of allergy in children with recurrent or chronic sinusitis. Niger Med J 2014;55:474-9.

Source of Support: Nil, Conflict of Interest: None declared.