

DETERMINATION OF FREQUENCY OF ALLERGIC RHINITIS IN MUMBAI METROPOLITAN REGION USING QUALITATIVE SEMI-STRUCTURED INTERVIEWS OF PHYSICIANS

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ABSTRACT

Allergic rhinitis is most common, often neglected and costly disorder that affects respiratory system. Different co-morbidities such as sinusitis, asthma, otitis media are associated with it. It also affects quality of life of patients. Till this date, treatment of this disease is focused on symptomatic relief and total cure is still impossible. Prevalence of this disease in countries like India is still not available from authorized sources. Considering these facts, study was designed to explore different aspects of disease. Semi structured qualitative interviews of physicians was conducted in Mumbai metropolitan region of India. In total response rate of 58.62% was observed with

experience of physicians from 5 years to 47 years. It was found that prevalence of allergic diseases was found to be 10-30%. Out of which prevalence of allergic rhinitis was found to be 20-30%. Watery runny nose was most commonly occurring symptom. Complications such as asthma, sinusitis and otitis media occur due to allergic rhinitis. Dust was found to be the principal allergen to cause allergic rhinitis. Family history was found to be responsible factor for the disease. Also it was found that allergic rhinitis moderately affects quality of life of patients.

KEYWORDS: allergic rhinitis, semi structured qualitative interviews, physicians, Mumbai, India.

INTRODUCTION

Allergic rhinitis is defined by World Allergy Organization as disorder wherein immune system produces IgE mediated response to allergen and has symptoms such as sneezing, rhinorrhea, itching and nasal congestion.^[1] Around 400 million people in the world are

currently suffering from allergic rhinitis and most of the cases are WAO in depth review on allergic rhinitis suggests that around 400 million people suffer in the world from allergic rhinitis and most of the cases are undiagnosed and undertreated.^[2,3]

According to World Health Organization (WHO), this affects 10-30% of world population.^[4] Prevalence of allergic rhinitis is around 7.8% in United States of America (USA), 5.9% in France and 29% in United Kingdom (UK).^[4] However, in India no such study of prevalence was conducted in particular to study allergic rhinitis. Unofficially, it was suggested by researchers that approximately, 20-30% of Indians suffer from at least one allergic disease.^[5] Study by Sinha et al suggests that prevalence of allergic rhinitis is 11% in Mehrauli, South Delhi area in 1200 adults. However, study was not nationwide and no such exhaustive data on allergic rhinitis is still available.^[6] Earlier study was conducted in year 1964 that suggested prevalence of allergic rhinitis of 10% in India. Allergic rhinitis and its impact on asthma (ARIA) initiative in its Asia Pacific workshop report highlights the fact that this disorder has not received attention of both physicians and patients.^[7]

Most of the patients and physicians of allergic rhinitis often ignore this order. Lancet in its Editorial in year 2008 have highlighted the fact that allergic rhinitis is most common, neglected and costly disease.^[8] It was observed that allergic rhinitis reduces quality of life (QOL) significantly. In particular, it affects social behavior of patient.^[9] Different types of treatment options are available for allergic rhinitis. Allopathic, Ayurvedic, Homeopathic and Unani systems of medicines are available as treatment option.^[10-13] However, till this date, no full proof cure has been found for this disease. Objective of the current research is to evaluate frequency of allergic rhinitis from semi-structured qualitative interviews of physicians in Mumbai metropolitan region. This will provide in depth information about clinical practice in treatment and management of allergic rhinitis.

METHODS

Semi-structured interviews or qualitative interviews provide detailed information about the topic. As it basically focuses on opinions, results or responses of interviewees might be controversial. However, aim of study remains to stimulate reflection and exploration of information about the disease condition.^[14] Purpose of choosing semi-structured interviews is their value in picking up unique findings of physicians that they have acquired over years of experience as well as some common experiences. These things cannot be explored from conventional questionnaire based surveys. Before preparation of protocol for semi-structured

interviews, pre-pilot or exploratory study and pilot study were carried out. Studies have revealed that more experience provide expertise to physicians in particular area. Experience of physicians is also important as it has capacity to provide right answers through their clinical judgement.^[15,16]

Pre-pilot study

Pre-pilot study serves as thought clarifying stage for qualitative research. This involved conversation with one male ENT physician with 30 years experience. This conversation served as essential step in design of questionnaire for protocol.

Preparation of draft of protocol for qualitative semi-structured interviews

After pre-pilot study, relevant literature search was done and draft protocol of quantitative cross sectional survey was written. Protocol contained outline such as introduction, study design, brief information of disease and 18 open ended questions. This protocol was then subjected to pilot study.

Pilot study

Draft of protocol of cross sectional quantitative survey was sent to Dr. Indrajeet Gonjari, Research Guide, Texila American University, South Guyana and also discussed with one MD; two MBBS; one MS (ENT).

Finalisation of protocol for cross sectional quantitative survey

Changes suggested by all of them were made and protocol was finalised.

Study setting

Study was carried out in private clinics, hospitals, Govt. hospitals of Mumbai metropolitan region.

Study population and sample size

Study involved semi-structured interviews of physicians with following qualifications.

- MBBS (Bachelor of medicine and bachelor of surgery)
- MD (Doctor of medicine) (Medicine)
- MS (ENT) (Master of surgery in Ear, Nose and Throat)

- Alternative system practitioners (Bachelor of Ayurvedic Medicine and Surgery; Bachelor of Homeopathic Medicine and Surgery and Bachelor of Unani Medicine) including MD qualifications of these disciplines

Potential participants will be identified by using local healthcare professionals' directory.^[17] Sample size of around 90 is expected.

Ethical considerations

As this is non interventional study of physicians no ethical approval will be required. As study will involve opinions of physicians only based on their experience, there is no need of ethical approval from ethics committee. Indian regulations, particularly ICMR guidelines do not provide any mention of semi-structured qualitative interviews of physicians. Authors have also consulted two ethics committees in Mumbai, both of them told me that ethics approval is not required as this study is conducted in population of physicians and not the patients directly.

Recording, Data Collection and Analysis

While taking interview, written notes will be taken so as to identify key points in interview. Recording of interview audio tapes will be done using SONY WALKMAN NWZ-B163F and these will be heard and transcribed into notes. This data will be categorised so as to convert it into quantitative data and this data will be represented graphically in form of bar graphs. Wherever applicable, percentage analysis will be done. Data analysis and representation will be done using Microsoft Excel 2007.

Study Duration

Study was conducted from 01 November 2016 to 15 February 2017.

RESULTS

Qualitative Semi structured interviews is such type of research that helps in gathering information not available from other sources.^[18]

Respondent's pattern

In total, 87 physicians were approached and out of them only 51 agreed to participate in this study. It was found that professionals declined to respond as many of them were not aware about method of semi-structured interviews; they had lack of time; or they were not

comfortable with recording of interview session. Therefore, response rate was observed to be 58.62%.

Qualification and Experience of Physicians

Physicians approached were qualified (MBBS, MD (medicine), MS (ENT), BAMS / MD (Ayurveda), BHMS/MD (Homeo), BUMS/MD (Unani)) and were having different experience in their profession (0 to 50 years). Figure 1 indicates qualification of physicians and Figure 2 indicates their experience.

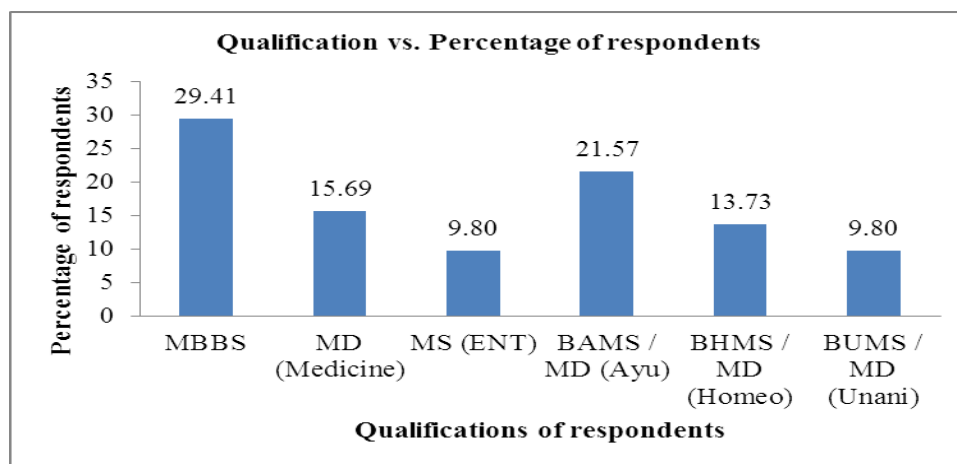


Figure 1: Qualification of physicians participated in the study.

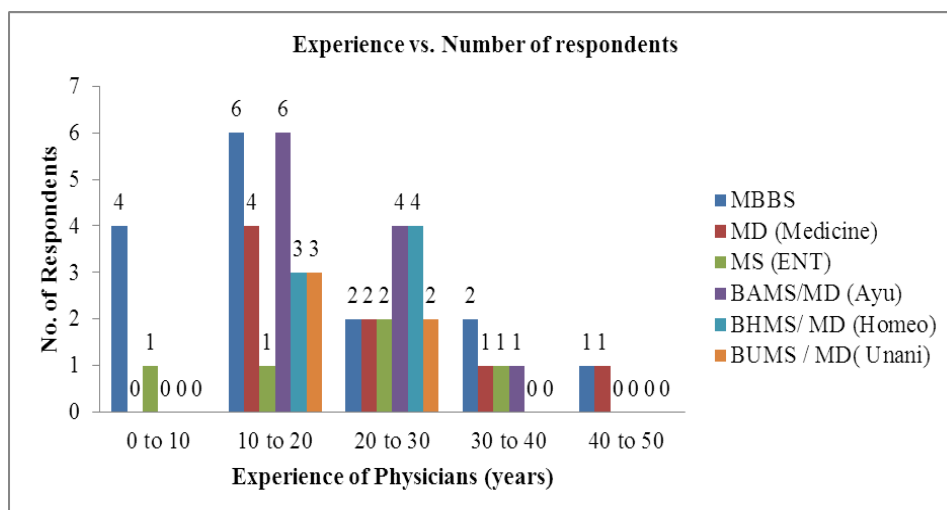


Figure 2: Experience of physicians participated in the study.

Percentage of patients with allergic diseases & allergic rhinitis

Questionnaire of the semi-structured qualitative interviews was focused on number of patients with allergic diseases that physicians examine every month. They were also asked about how many were found to be suffering from allergic rhinitis out of them.

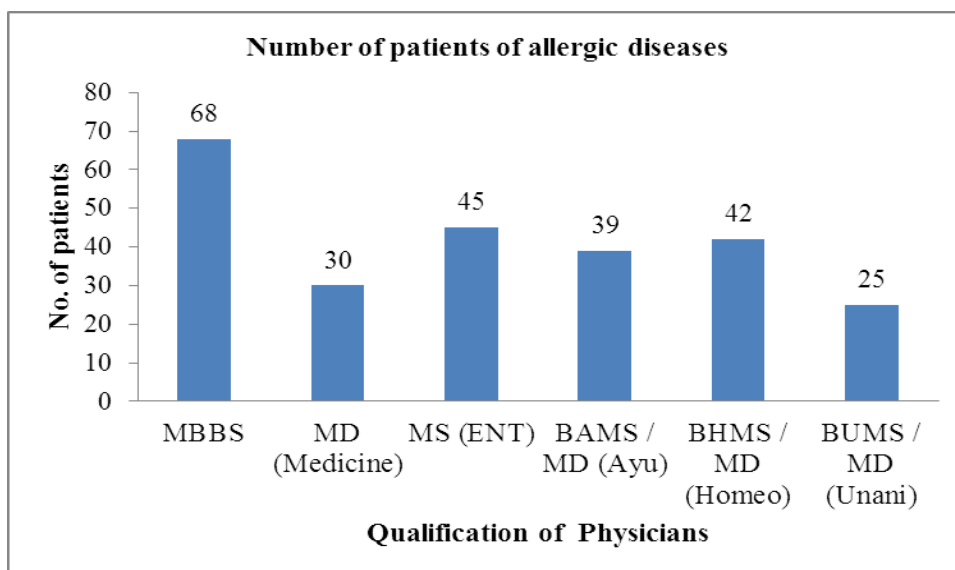


Figure 3: Number of patients suffering from allergic diseases.

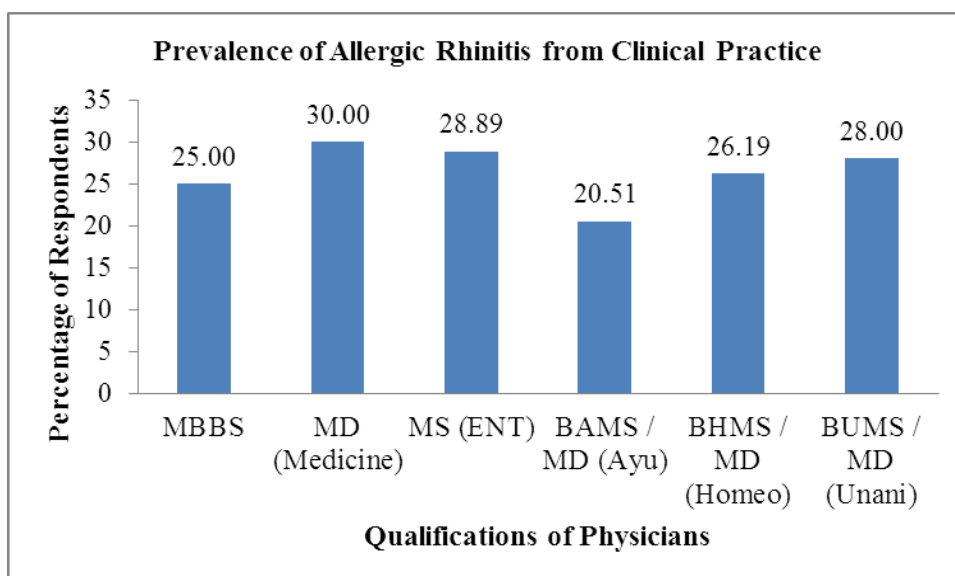


Figure 4: Prevalence of allergic rhinitis in clinical practice according to physicians.

Age group of patients and Gender Differences

Physicians were asked about most common age group of patients in which allergic rhinitis is caused. It was found that adolescents and children. It was found that prevalence of allergic rhinitis is higher in adolescents and children. Figure 5 highlights the fact.

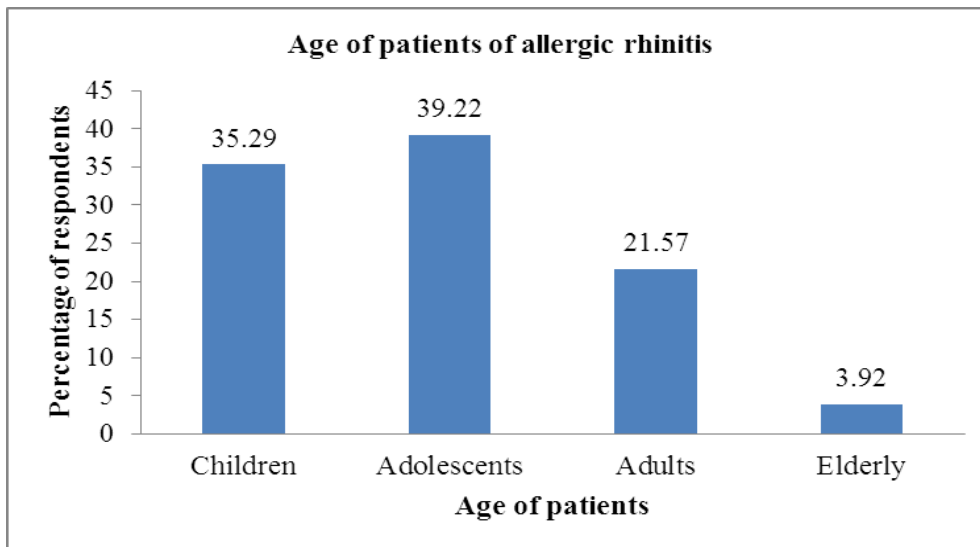


Figure 5: Prevalence of allergic rhinitis in different age groups.

This is further supported by following two responses

A male ENT surgeon stated that, *“Generally speaking, allergic rhinitis starts showing symptoms before teen age and is also most common in children”*.

A female MBBS physician stated, *“It is very common disease that occurs in children, although frequently seen adolescents. However, in adults, prevalence is less than these two categories”*.

Also it was found that, there is no difference in gender in causation of allergic rhinitis. This fact is highlighted by 66.67% of respondents. Figure 6 highlights this fact.

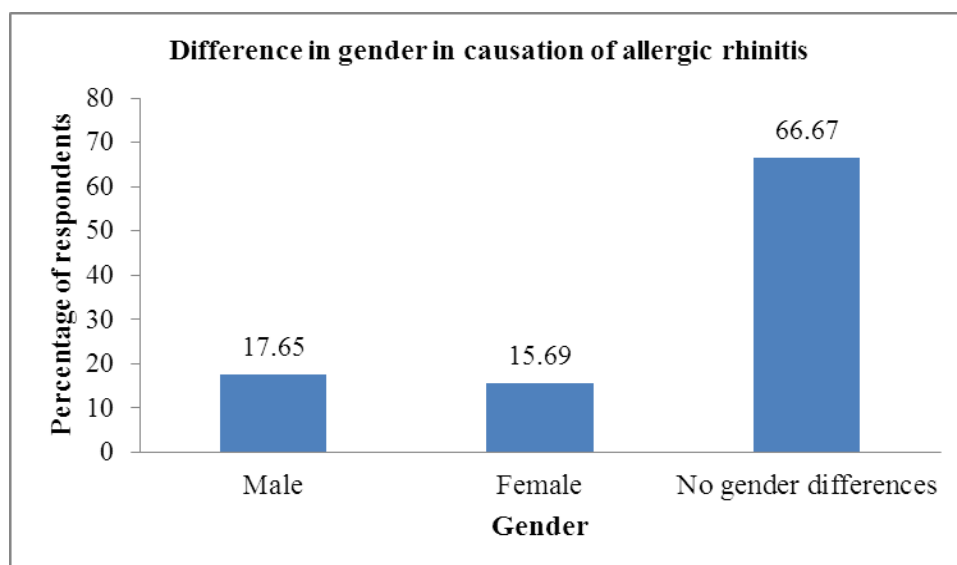


Figure 6: Difference in gender in causation of allergic rhinitis.

Job descriptions of patients

Physicians were asked about whether working pattern affects causation of allergic rhinitis. From the responses it was found that according to 76.47% of physicians, allergic rhinitis occurs mostly field based job workers whereas it occurs in 23.53% in office workers. A female MD physician stated that, *“Most of workers who do field based jobs, e.g. marketing executives, medical representatives, delivery boys, courier pickup and delivery boys may have more exposure to allergens particularly dust and air pollution while in city. Office workers on the contrary have less exposure to allergen, but mould that has grown in air conditioning units (which may not be cleaned or maintained) can also cause allergic rhinitis”*.

Symptoms of allergic rhinitis

Question was asked to professionals about what are most common symptoms that they observe in allergic rhinitis. Figure 7 highlights the fact.

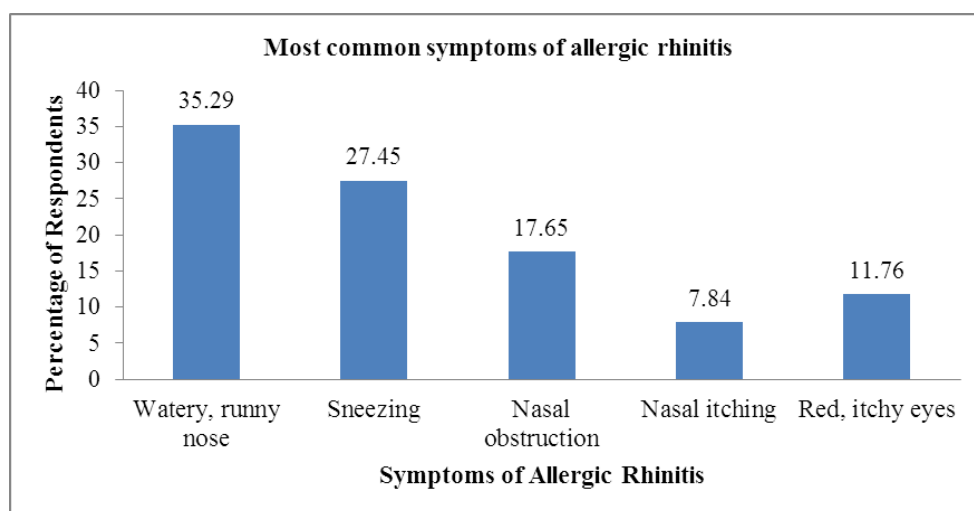


Figure 7: Most common symptoms of allergic rhinitis.

From the results it can be seen that watery, runny nose is the most commonly observed symptom in patients.

Types of allergic rhinitis

Physicians were asked about which type of allergic rhinitis is most common in population. According to respondents, it was found that persistent form of allergic rhinitis occurs mostly (45.10%). A male MD (Ayurveda) has stated fact supporting this data, *“As population in Mumbai is continuously exposed to different allergens, particularly dust and air pollution, this leads to allergic rhinitis.”* Another female MBBS physician also stated the same fact. Figure 8 shows the data in graphical way.

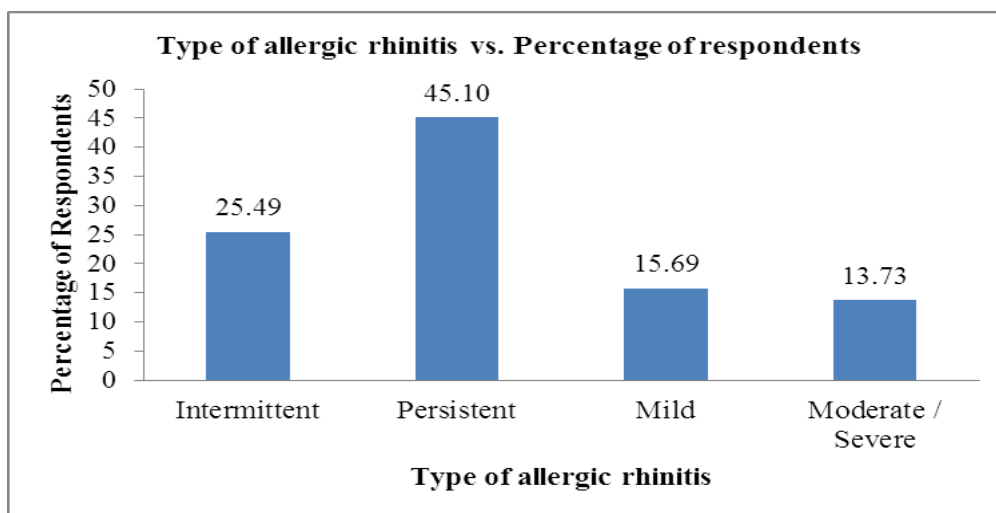


Figure 8: Type of allergic rhinitis occurring in patients.

Complications of allergic rhinitis

Question was asked to physicians about what are the complications that can occur if allergic rhinitis is inadequately controlled or untreated. A female MD physician stated that, *“If not controlled on time, it leads to complications such as chronic sinusitis, recurrence of nasal polyps and otitis media.”* However, one ENT surgeon added to it that, *“I usually come across these cases. Many a times general physicians fail to properly identify and investigate the allergic rhinitis and due to which complications start occurring. Particularly in children and young age adolescents, this leads to asthma or in certain cases where asthma is already there; it leads to aggravation of it.”* Figure 9 shows responses of physicians.

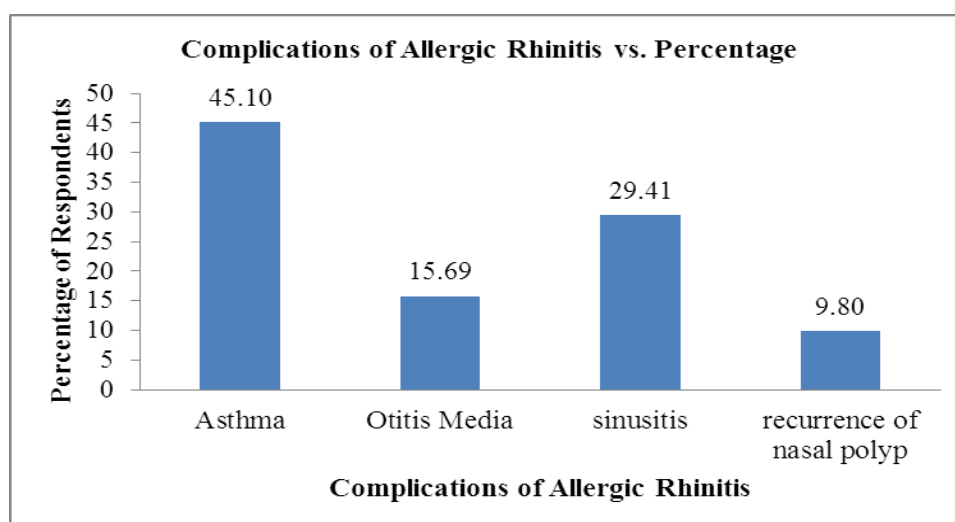


Figure 9: Complications of allergic rhinitis.

Referral to MS ENT or Otolaryngologist

Question was asked to physicians about to whom they refer the case if they are not treating the case. Around 35.29% physicians responded that they refer the case to MS ENT or Otolaryngologist.

Examination tests for allergic rhinitis

Respondents were asked about how they arrive at decision of allergic rhinitis. Which tests they are using for this examination? Although there are many tests like rhinometry are available, it was found that respondents prefer to use only three tests here, viz. visual assessment, nasal respiratory airflow and nasal endoscopy. Out of them, visual assessment and nasal endoscopy are more popular. Figure 10 highlights the fact.

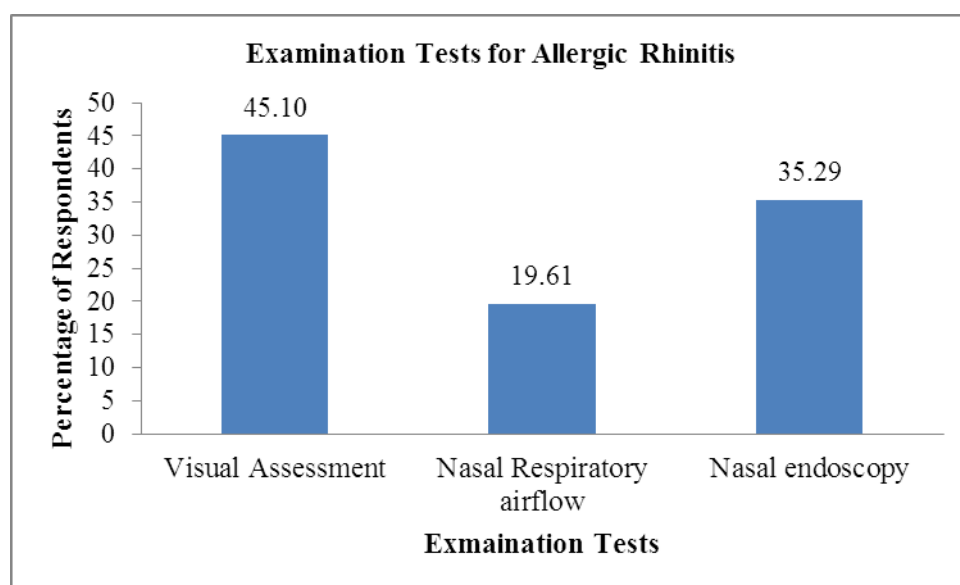


Figure 10: Examination tests for allergic rhinitis.

Diagnostic allergy tests for allergic rhinitis

Skin prick testing and specific IgE blood test were two tests that are frequently done for allergy testing in allergic rhinitis (AR). Skin prick testing is most popular test which is used by 68.63% of respondents whereas 31.37% use IgE test.

Type of allergens causing allergic rhinitis

Allergic rhinitis is caused due to exposure to different allergen. Physicians were asked about most common allergen that causes allergic rhinitis. It was found that dust is contributing most i.e. 37.25% of respondents. Figure 11 shows the data in graphical way.

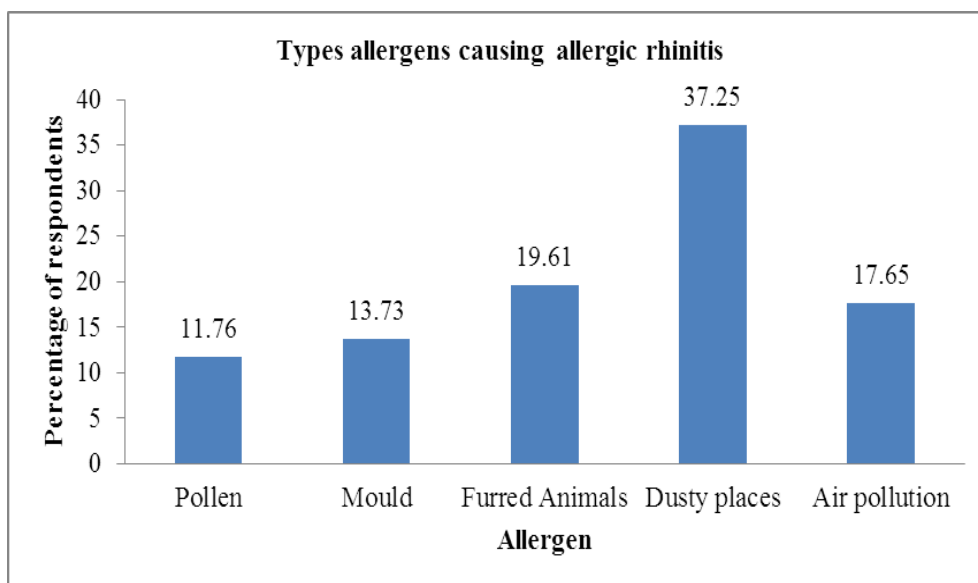


Figure 11: Types of allergens that cause allergic rhinitis.

Supporting to this fact, a male MD (Ayu) physician added, “*Particularly in areas of Mumbai, dust is major cause of allergic rhinitis. This might be due to roads that contain potholes and air pollution due to vehicles*”.

Drug Treatment for allergic rhinitis

As this study includes responses from physicians of different systems of medicine, line of treatment or drugs used for treatment definitely differ.

Different allopathic physicians suggested that different drugs are used in practice. This includes drugs from categories such as oral H1 antihistaminics, intranasal H1 antihistaminics, intranasal corticosteroids, intranasal cromone, antileukotrienes and immunotherapy.

In case of Ayurveda, different herbal remedies are used by physicians. These include *Tinospora cardifolia*, Ginger, *Albizia lebbek*, *Picorrhiza kurroa*, *Tylophora indica*, *Piper longum* and Turmeric.

Similarly in homeopathy, drugs like *Allium cepa*, *Luffa operculata*, *Galphimia glauca*, *Histamine* and *Sulphur* are used for treatment.

In Unani, drugs like *itrifal ustukhudoos* with cloves (*qaranfal*) can be used for treatment.

Use of combination of two different therapies

Physicians were asked about whether they use combination therapy for treatment of allergic rhinitis. It was found that 15.69% of physicians recommend combination therapies.

Duration of therapy prescribed

Duration of therapy of allergic rhinitis is also important aspect as due to symptomatic therapy, relapse can occur on exposure to allergen again. Around 52.94% physicians said that regular medicines are prescribed, however, 47.06% physicians said that they prefer to symptomatic treatment.

Effectiveness of therapy

Physicians were asked about how effective treatment is for allergic rhinitis. Some statements from physicians are representative in this regard. A male MD (Allopathic) has stated, *“Although different types of drugs such as steroids, anti-histamines, leukotrine inhibitors, mast cell stabilizers are there, but still they are found to be only moderately effective in cure of disease.”* Another MBBS physician said, *“Despite of large amount of drugs being used for this disease, achieving target of cure is still impossible.”* Ayurvedic and Homeopathic Physicians said that treatment is available but needs exact diagnosis along with diet and other restrictions on patient. Figure 12 shows results of the question.

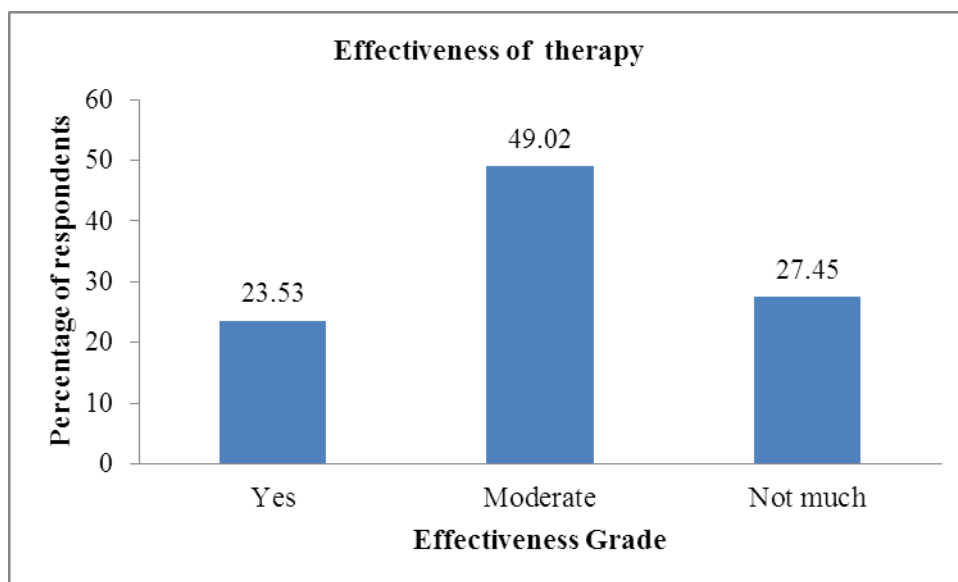


Figure 12: Effectiveness of allergic rhinitis treatment.

Family history of allergic rhinitis

Question was asked to physicians that whether allergic rhinitis is having relationship with family history. It was found that according to 74.51% respondents, family history is important for causation of allergic rhinitis and 25.49% said that it is not having relationship with allergic rhinitis.

Effect on quality of life

Physicians were asked about effect of allergic rhinitis on quality of life. According to responses, 62.75% respondents said that it has definite effect on quality of life whereas according to 37.25% it has effect on up to some extent.

According to male MD (Medicine), *“Allergic rhinitis has impact on both children and adults. In children it can cause delayed learning, difficulty in integration with fellow peers and anxiety. In both adults and children, it can cause related disorders such as sinusitis, otitis media and frequent respiratory infections. Not only disease, but pharmacological treatments have impact on quality of life. E.g. Anti histaminics have sedation as adverse effect”*.

DISCUSSION

Although response rate of 58.62% seems very low, possible reasons behind this might be recording of interview using Sony Walkman NWZ-B163F, non-familiarity with methodology of semi-structured interview or fear of opinions due to recording, etc. During entire conduction of study, co-operation of MS (ENT) physicians and physicians of alternative systems of medicine was encouraging. Many of them said there is need to conduct such studies as people and even physicians tend to neglect allergic rhinitis. Studies have revealed that more experience provide expertise to physicians in particular area. Experience of physicians is also important as it has capacity to provide right answers through their clinical judgement.^[19, 20] During this study responses were obtained from physicians of experience 5 years to 47 years.

Due to presence of easily available care and image of family doctor, MBBS practitioners look after many cases of allergic diseases. Considerably, people from India, also believe on alternative systems of medicine. Hence, significant numbers of patients also refer to ayurvedic, homeopathic and unani physicians.

Prevalence of allergic diseases was found to be 10 to 30% in this study. Prasad et al has also highlighted the same fact.^[4] In the study conducted by Sinha et al, prevalence of asthma in Southern India was 28.7% and that of asthma out of it was 7.5%.^[5] Findings of current study are according to these studies. Out of these allergic patients, 20-30% of patients are suffering from allergic rhinitis. This finding is in accordance with studies conducted by Varshney et al.^[21]

According to ARIA guidelines, allergic rhinitis is most prevalent in school children. In pre-school children, it is difficult to diagnose this disease. However, adolescent and school children it becomes difficult to diagnose this disease. In this population, diagnosis and treatment is same as that of adults, only dosage adjustment is needed.^[7] It has been also observed that prevalence of allergic rhinitis increases from childhood to adolescent age. Also, boys in this age are more prone for allergic rhinitis than girls. After start of adulthood, rate in both genders remains the same. Findings of the current research are accordingly and are highlighted in Figure 5 and 6.

Occupational exposures could cause allergic rhinitis. This is evident from the study of grape farm workers in Greece.^[22] From the study conducted in farm workers and control group, it was found to have allergic rhinitis and work related respiratory symptoms in farm workers as compared to comparator.^[23] Similar findings are reported in construction industry.^[24] Current study findings correlated with these results. This indicates that person who is doing field work or any other work has probability of allergic rhinitis than office workers.

Symptoms on one side of nose, thick green or yellow discharge of mucus, post nasal drip, facial pain, recurrent nose bleeds and loss of smell are generally not found in Allergic rhinitis. Presence of any one of these symptoms indicates alternative diagnosis and referral of specialist is recommended. Facial pain, loss of smell, and post nasal drip are seen in sinusitis. Hence distinction between symptoms needs to be made so as to confirm diagnosis of allergic rhinitis. Any one of the symptoms such as watery runny nose, sneezing, nasal itching and obstruction and conjunctivitis (including red itchy eyes) indicate possibility of allergic rhinitis. Findings of the study indicated that most commonly occurring symptom is watery runny nose. These findings are in accordance with guideline of Allergic Rhinitis and its impact on Asthma (ARIA).^[25]

Identification of type of allergic rhinitis is very crucial for initiating treatment. British Society for Allergy and Clinical Immunology (BSACI) has stated guidelines for this. Accordingly, intermittent, persistent, mild and moderate-severe are different types of allergic rhinitis.^[9] Findings of the current study indicated that most of population in Mumbai region has persistent form of allergic rhinitis.

Poorly controlled allergic rhinitis can lead to different co-morbidities such as asthma, otitis media, sinusitis, recurrence of nasal polyps, hearing impairment, abnormal craniofacial development and sleep apnoea, etc. Drugs used for treatment of allergic rhinitis can also cause negative neuropsychiatric effects that can cause some of these complications.^[26] Similar observation has been found in the current research. Out of all of these complications, asthma is a major disease which occurs due to allergic rhinitis as evident from Figure 9. The finding is similar to that of mentioned by Kim H et al.^[27]

Examination of any disease by physician is necessary to confirm the presence of disease and identify its signs. Different tests such as visual assessment, anterior rhinoscopy, objective measures of nasal airway, peak nasal inspiratory airflow, acoustic rhinometry, rhinomanometry and nasal endoscopy are recommended by BSACI guidelines.^[9] However, physicians participated in this study perform only visual assessment, respiratory airflow and nasal endoscopy. Knowledge of other tests needs to be provided to arrive at conclusion of allergic rhinitis.

Diagnostic tests such as skin prick test and IgE blood test are advised from BSACI.^[9] It has been found that physicians from the study also perform them. Skin prick testing should be carried out routinely in all cases. However, this test should be carried out generally in allergy clinics as patient may develop anaphylaxis due to allergen exposure. Allergen specific IgE test is also recommended which can provide confirmed diagnosis of allergic rhinitis.^[7, 9]

Increase in allergen exposure and reduced immunity are important factors from which allergic rhinitis could occur. Exposure to allergens such as pollen, moulds, furred animals, dust, air pollution are some these allergens.^[28] From the study, it was found that dust is principal allergen causing allergic rhinitis in Mumbai region.

Different physicians have different opinion. However, 52.94% of respondents said that regular treatment is required for this condition. One of the reasons could be less effectiveness

of therapy options available. According to ARIA guidelines, effectiveness of treatment of allergic rhinitis is very less.^[28] According to 15.69% physicians combination therapies should be used for allergic rhinitis. Weinstein SF suggested that combination therapy of two different categories of drugs improved quality of life and has shown symptomatic improvement.^[29] Similarly many such examples are available which suggests that combination approach is beneficial for treatment of disease. Similarly, it can be revealed from Figure 12 that therapy of disease is moderately effective. Supporting to this observation, Small et al and Geoffroy S have presented works indicating limited effectiveness of currently available treatments.^[30,31]

Around 74.91% of physicians said that family history has relationship to cause allergic rhinitis. Genetic segregation studies and investigations in twins have suggested genetic basis of causation of allergic rhinitis. Studies on chromosome 2, 3, 4 and 9 revealed the fact of genetic hereditary link between allergic rhinitis.^[32] De Yun Wang has also highlighted the same fact.^[33]

Various researchers have studied impact of allergic rhinitis on quality of life of patients. Camelo-Nunes and Sole has extensively reviewed this effect and presented evidence of relationship with quality of life.^[34] Similar review was performed by Ozdoganoglu and Inacli.^[35] Generally speaking, evaluation of quality of life is done using Health Related Quality of Life (HRQL) questionnaires which are either generic or specific questionnaires. In adults, allergic rhinitis can cause fatigue, asthenia, and decrease in general health perception and social function and in children it causes learning impairment, problems during integration with fellow students, anxiety and family dysfunction. Along with it, allergic rhinitis can cause disorders such as sinusitis, otitis media, and frequent respiratory infections. This reduces HRQL.^[36] Survey of patients was carried out to study effect on quality of life in Europe and USA.^[37] The findings of current study are in accordance with literature cited above.

CONCLUSION

Allergic rhinitis affects respiratory system and has also moderate impact on quality of life of patients. Different co-morbidities such as sinusitis, asthma, otitis media are associated with it. Different drugs and systems of therapy were tried but still cure from the disease condition is impossible. Therefore, to explore more about disease condition, treatment and management of disease, semi-structured qualitative interviews were conducted in Mumbai region of India. Semi-structured interviews or qualitative interviews provide detailed information about the

topic. Response rate of 58.62% was observed with experience of physicians from 5 years to 47 years. Prevalence of allergic rhinitis was found to be 20-30%. Dust was principal allergen to cause allergic rhinitis. Family history was found to be responsible factor for the disease. Also it was found that allergic rhinitis moderately affects quality of life of patients. However, awareness of newer drugs, combination therapies and systems of medicine and treatment strategies need to be improved. Further, clinical trials on newer drugs from different systems of medicines research should be conducted so as to achieve target of cure of disease.

REFERENCES

1. World Allergy Organization. Available from: http://www.worldallergy.org/professional/allergic_diseases_center/rhinitis/rhinitissynopsis.php (Accessed on 01 September, 2016)
2. Skoner DP. (2001) Allergic rhinitis: definition, epidemiology, pathophysiology, detection and diagnosis. *J Allergy Clin Immunol.* 108(1 Suppl): S2-8.
3. Scarupa MD, & Kaliner MA (2015) In-Depth Review of Allergic Rhinitis. *World Allergy Organization.* Available from: http://www.worldallergy.org/professional/allergic_diseases_center/rhinitis/rhinitis_indepth.php (Accessed on 01 September, 2016)
4. Prasad R, & Kumar R (2013). Allergy Situation in India: What is Being Done? *Indian J Chest Dis Allied Sci.*, 55: 7-8.
5. Sinha B, Vibha, Singla R, Chowdhury R. Allergic Rhinitis: A neglected disease - A community based assessment among adults in Delhi. *J Postgrad Med.* 2015; 61(3): 169-175.
6. Viswanathan R. (1964) Definition, incidence, aetiology and natural history of asthma. *Indian J Chest Dis.*, 6: 108-24.
7. Shah A, & Pawankar R (2009). Allergic Rhinitis and Co-morbid Asthma: Perspective from India- ARIA Asia-Pacific Workshop Report. *Asia Pacific Journal of Allergy and Immunology.* 27: 71-77.
8. Editorial. Allergic rhinitis: common, costly, and neglected. *The Lancet.* 2008; 371(9630): 2057.
9. Scadding GK, Durham SR, Mirakian R, Jones NS, Leech SC, Farooque S, et al (2008). BSACI guidelines for the management of allergic and non-allergic rhinitis. *Clinical and Experimental Allergy.* 38: 19-42.

10. Sulemanni YM, Walker MJA. Allergic Rhinitis and its pharmacology. *Pharmacology and therapeutics*. 2007; 114: 233-260.
11. Karmarkar AB. Herbal (Ayurvedic) way of treatment and management of allergic rhinitis. *Int J Emerg Technologies and Innovative Research*. 2017; 4(10): (In Press).
12. Banerjee K, Costelloe C, Mathie RT, Howick J. Homeopathy for allergic rhinitis: protocol for a systematic review. *Syst Rev.*, 2014; 3: 59.
13. Fazeenah AHA, Quamri MA. Unani perspective of allergic rhinitis (Nazla Haar): A literary review. *J Pharmacognosy and Phytochemistry*. 2015; 3(6): 22-25.
14. Davies, M., B. Doing a successful research project: Using qualitative or quantitative methods. Palgrave Macmillan, Hampshire, UK. 2007.
15. Akl, O., A., Khairy, A., E., Abdel-Aal, N., M., Deghedi, B., S., Amer, Z., F. (2006). Knowledge, attitude, practice and performance of family physicians concerning holistic management of hypertension. *J Egypt Public Health Assoc*, 81(5): 337-353.
16. Kim, M., H., Park, H., G., Park, E., C., Park, K. (2011). Attitude and knowledge of physicians about cancer pain management: young doctors of South Korea in their early career. *Jpn. J. Clin. Oncol*, 41(6): 783-791.
17. Arogyadeep: Directory of health services. 3rd ed. Rotary Vikas Trust, Dombivli, India. 2013.
18. Jamshed S. Qualitative research method-interviewing and observation. *J Basic Clin Pharm*. 2014; 5(4): 87-88.
19. Akl, O., A., Khairy, A., E., Abdel-Aal, N., M., Deghedi, B., S., Amer, Z., F. (2006). Knowledge, attitude, practice and performance of family physicians concerning holistic management of hypertension. *J Egypt Public Health Assoc*, 81(5): 337-353.
20. Kim Y, Jho HJ, Kong KA, et al. Knowledge, Practices and Perceived Barriers Regarding Cancer Pain Management Among Physicians and Nurses In Korea: A Nationwide Multicenter Survey. *Plos One*. 2014; 9(8): e105900.
21. Varshney J, Varshney. Allergic rhinitis: an overview. *Indian J otolayngol Head Neck Surg*. 2015; 67(2): 143-9.
22. Chatzi L, Alegakis A, Tzanakis N, et al. Association of allergic rhinitis with pesticide use among grape farmers in Crete, Greece. *Occup Environ Med*. 2007; 64(6): 417-421.
23. Chatzi L, Prokopakis E, Tzanakis N, et al. Allergic Rhinitis, Asthma and Atopy Among Grape Farmers in a Rural Population in Crete, Greece. *CHEST*; 2005; 1237: 372-378.
24. Carino M, Romita P, Foti C. Allergy-Related Disorders in the Construction Industry. *ISRN Preventive Medicine*. 2013; 864679: 7.

25. Brozek JL, Bosquet J, Agache I, et al. Allergic Rhinitis and its Impact on Asthma (ARIA) guidelines—2010 revision. *J Allergy and Clin Immunol.* 2010; 126: 466-476.
26. Settipane RA. Complications of allergic rhinitis. *Allergy Asthma Proc.* 1999; 20(4): 209-213.
27. Kim H, Bouchard J, Renzi PM. The link between allergic rhinitis and asthma: A role for antileukotrienes? *Can Respir J.* 2008; 15(2): 91-98.
28. Mandhane SN, Shah JH, Thennati R (2011). Allergic rhinitis: An update on disease, present treatments and future prospects. *Int. Immunopharmacol.* 1646-1662.
29. Weinstein SF. Combination therapy in the treatment of allergic rhinitis. *Allergy Asthma Proc.* 2002; 23(1): 1-3.
30. Small M, Piercy J, Demoly P, Marsden H. Burden of illness and quality of life in patients being treated for seasonal allergic rhinitis: a cohort survey. *Clin Transl Allergy.* 2013; 3: 33. doi: 10.1186/2045-7022-3-33.
31. Geoffroy S, Charpin D. Management of allergic rhinitis. *F1000prime Reports.* 2014; 6: 94.
32. Davila I, Mullol J, Ferrer M, et al. (2009) Genetic aspects of allergic rhinitis. *J Investig Allergol Clin Immunol.* 19(1): 25-31.
33. De Yun Wang (2005). Risk factors of allergic rhinitis: genetic or environmental? *Ther Clin Risk Management.* 1(2): 115-123.
34. Camelo-Nunes IC, Sole D. Allergic rhinitis: indicators of quality of life. *J. Bras. Pneumol.* 2010; 36(1).
35. Ozdoganoglu T, Songu M, Inacli. Quality of life in Allergic Rhinitis. *Ther Advances in Resp Disease.* 2012; 6(1).
36. Meltze EO. Quality of life in adults and children with allergic rhinitis. *J allergy & clin immunol.* 2001; 108(1): s45-s53.
37. Canonica GW, Mullol J, Pradaliere A, Didier A. Patient Perceptions of Allergic Rhinitis and Quality of Life: Findings From a Survey Conducted in Europe and the United States. *World Allergy Organisation Journal.* 2008; 1: 138.