e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2026; 18(1); 156-161

Original Research Article

Assessment of Awareness and Prevalence of Allergic Rhinitis in North Bihar, India: A Cross-Sectional Study

Sujeet Kumar[1], Novelesh Bachchan[2], Shashi Kumar[3], Pawan Kumar Lal[4], Pankaj Patel[5]

[1]Associate Professor, Department of Oto-Rhino-Laryngology, Shri Krishna Medical College and Hospital (SKMCH). Muzaffarpur, Bihar 84004, India

[2]Senior Resident, Department of Oto-Rhino-Laryngology, Shri Krishna Medical College and Hospital (SKMCH). Muzaffarpur, Bihar 84004, India

[3]Senior resident, Department of Oto-Rhino-Laryngology, Shri Krishna Medical College and Hospital (SKMCH). Muzaffarpur, Bihar 84004, India

[4]Head of Department-cum- Professor, Department of Oto-Rhino-Laryngology, Shri Krishna Medical College and Hospital (SKMCH). Muzaffarpur, Bihar 84004, India

[5]Associate Professor, Department of Pathology, Shri Krishna Medical College and Hospital (SKMCH). Muzaffarpur, Bihar 84004, India

Received: 01-10-2025 / Revised: 15-11-2025 / Accepted: 21-12-2025

Corresponding author: Dr. Sujeet Kumar

Conflict of interest: Nil

Abstract

Background: Allergic Rhinitis (AR) is an IgE (Immunoglobulin-E) mediated immunological response of nasal mucosa characterized by watery nasal discharge, nasal obstruction, sneezing and itching in the nose. AR is hazardous diseases rising at a very fast rate. Increase in knowledge and complications regarding AR expected to have a better outcome of the disease.

Objective: The study was cross-sectional type, planned in north Bihar to assess the awareness and diagnosis about AR, and includes 600 participants.

Method Demographic data and knowledge of participants on various aspects of AR were collected by a well-prepared questionnaire asking from patients of ENT Department during January 2025 to December 2025. Nasal cytology was taken from the inferior turbinate from the selected patient.

Results: Diagnosis was based on symptom and nasal eosinophilia in cytology of nasal smear. It was found that 39.83% of participants had knowledge of AR. Only 10.67% knew that Allergic rhinitis was caused by insufficient antihistamines.73.67% of respondents did not know any Allergic rhinitis symptoms. 61% of respondents did not know how this disease can be prevented. 88.33% of respondents did not have any idea about the complication of Allergic Rhinitis. This study indicated that awareness of Allergic rhinitis was very poor, especially in subjects with low education.

Conclusion: The study concluded that there is an urgent requirement of different strategies like Allergic Rhinitis health campaigns, issuing pamphlets of information about AR, public speaking sessions, etc. to spread awareness among the general population.

Keywords: Allergic Rhinitis; Prevention and management; Risk factors; Awareness.

DOI: 10.25258/ijcpr.18.1.23

Introduction

Nasal allergy is also known as allergic rhinitis is a group of IgE hypersensitivity disorders where nasal mucosa produces an abnormal immunological response to normally harmless antigens (allergens) resulting in symptoms such as bouts of sneezing, rhinorrhea, itching, nasal blockage, and nasal foreign-body sensation. Typical inhalant allergens include house dust mite, grass and tree pollens (plant origin), and animal origin such as cat, dog, and horse and occasionally, moulds. [1] Common symptoms of allergic rhinitis are sneezing and running nose which is easily recognized, and lead to predominant blockage, where the diagnosis may be missed.[2] Other symptoms related to nasal connections related with granular pharyngitis, glossitis, stomatitis and laryngitis. In allergic rhinitis, quality of life is reduced due to direct exposure of allergen.[3] Complications related to nasal allergy is allergic conjunctivitis, rhinosinusitis and asthma. There is a higher

prevalence of asthma among those suffering from persistent and more severe allergic rhinitis.[4] Multicenter study performed by the Asthma Epidemiology Study Group of the Indian Council of Medical Research observed the prevalence of allergic rhinitis in approximately 20% of the population in India.[5] Many factors were recognized by scientist like genetic pre-deposition, industrialization, air pollution, pets and childhood exposure, contribute in continuous increase in prevalence of allergic rhinitis.[6] There is high prevalence of nasal allergy worldwide and there is associated low level of knowledge and awareness of nasal allergy, as demonstrated in previous studies. [7,8] The objective of this study was to survey the prevalence of allergic rhinitis in study area, to find out how many proportions of people aware for this pandemic disease. During this survey we would try to spread awareness among primary care physician and common people about risk factors, complication, prevention method and primary treatment of allergic rhinitis.

Material and Methods

Place of study: This study was conducted in the North Bihar, OPD, ENT department and Department of Pathology, SKMCH, Muzaffarpur Bihar. It was a community-based cross-sectional study and includes male and females from different age groups from different areas. The name of participants was not included in questionnaires and all the personal information obtained from participants was kept confidential.

Inclusion Criteria: All participants aged 12 year and above.

Exclusion Criteria:

- Children aged <12 year.
- Patient with sinusitis.
- Patient with bleeding disorder.

Sample Size: Studies were done in 600 cases (252 males, 348 females)

Duration of study: January2025 to December 2025.

Study Design: Demographic data of subjects were recorded by filling a questionnaire covering the following parts: age, gender, family history, residence, education level and duration of illness if anyone suffering from allergic rhinitis, knowledge about allergic rhinitis, its cause, complications and preventive measure of allergic rhinitis. The assess allergic rhinitis we collect sample of secretion and smear were spread over the glass slide and after drying the smear in air, it was fixed by Leishman stain and the slide was examined under the microscope in 125x magnification for eosinophil and mast cells in Shri Krishna Medical College Muzaffarpur.

Statistical analysis: Based on detail questionnaire for awareness about AR and number of eosinophils was recorded using the criteria for the quantification.[9] 0 = No cell in any high- power field, + = 1 to 3 cells some high power, ++=some cell in most of the high-power field and +++ = Many cells in all the field for the diagnosis of allergic rhinitis. Descriptive and inferential statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean ± SD (Min-Max) and results on categorical measurements are presented in number (%). Significance is accessed at 5% level of significance.

Statistical software: The statistical software namely SAS 9.2, SPSS 15.0, Stata 10.1, Med Calc 9.0.1, and R environment ver.2.11.1 were used for the analysis of the data and Microsoft word and Epi info have been used to generate graphs, table etc.

Results

This was a cross-sectional study on 600 participants of more than 12 years of age were randomly selected from OPD ENT department SKMCH, Muzaffarpur, district situated in north Bihar, India.

Table 1 shows the general characteristics of 600 participants in which 348 participants were female (58%) and 242 were male (42%). Most of them (46%) had completed their secondary studies, 23.34% completed their higher secondary studies and 21.67% were illiterates. Those who had not completed their study at matriculation level were considered illiterate. Only 9% of people were found to be graduate or postgraduate.

Table-2 shows the percentage of participants suffering from AR and related questionnaires of their daily life. Prevalence rate of Allergic Rhinitis in this region was found 11%. Only 3.6% of participants visited doctors for their regular checkups. 83.33% of participants did not do any type of exercise. 10.33% went for a walk regularly. Only 3.6% of people used to walk and exercise too. 2.16% of respondents exercised daily. 14.16% of all participants had an Allergic rhinitis family history. Among which 50% of allergic rhinitis patients had a positive family history. 39.83% of participants had knowledge about allergic rhinitis; among which the majority of respondents (23.83%) knew that in allergic rhinitis patient have nasal discharge and nasal obstruction. 10.67% of people knew about sneezing and itching in nose is relation to allergic rhinitis. 60.17% of participants had no idea about Allergic rhinitis but they know that it is a type of disease. Knowledge of participant about symptoms and complication of Allergic rhinitis were summarized in Table-3. The majority of participants (73.67%) had not any idea about allergic rhinitis symptoms. When we asked about

allergic rhinitis symptoms, most of participant's (17.5%) answer was nasal discharge and nasal obstruction, 4.83% knew about sneezing and itching in nose. Only 1% of the participants having sufficient knowledge of symptoms like fullness of ear, conjunctival irritation headache, weakness, fatigue of AR. 88.33% of responders had no knowledge about any allergic rhinitis complication. 3.16% knew that allergic rhinitis could result in asthma, 4.83% knew about eczema is one of the complications, 1% urticaria, 2.2% knew about granular pharyngitis and laryngitis and only 0.5% of respondents knew about more than one complication.

Table 4 shows knowledge of participants about risk factors, treatment and preventive measures of allergic rhinitis 73.66% of participants had no knowledge about any risk factors of AR. 7.67% of participants thought dust was the major risk factor.4.3% knew about smoke is risk factor.1.67% knew about cold, 4.17% knew about smog, 4% knew about drug reaction was risk factor. 5.5% of respondents had knowledge of more than one risk factor. 5% thought that if parents had allergic rhinitis then their children may develop AR. 42.83% of participants believed that antihistamines were only treatment of AR and a small percentage (21%) of participants knew that the treatment of AR was immunotherapy. 23.6% of participants thought that allergen avoidance was one of the preventive measures but 61% had no idea about any preventive measure.

As shown in Table 5, number of eosinophils was recorded using the criteria for the quantification as suggested by Ozale & Karma 1982. 0 = No cell in any high-power field; + = 1 to 3 cells some high power; ++ = Some cells in most of the high-power field and +++ = Many cells in all the field. Among all participants 11% were suffering from AR, based on the assessment of eosinophils. Among these most of them (43.94%) have ++ level of nasal eosinophil.

Table1: Age distribution and educational level

Categories		Number (Total=600)	%
Sex	Female	348	58.00
	Male	252	42.00
Education level	Illiterate	130	21.67
	10th	276	46.00
	12th	140	23.34
	Graduates and more	54	09.00

Table 2: Lifestyle of participant and allergic rhinitis related questionnaires

Categories	Answer of participants	Number	%
A Suffering from AR	yes	66	11
	No	534	89
Duration of having AR	<1	4	0.67
	1-5	11	1.83
	6-10	7	1.17
	>10	8	1.34
Regular checkup	yes	22	3.6
	No	578	96.34
Exercise	Regular walking	62	10.33
	Regular walking + exercise	22	3.6
	Only exercise	13	2.16
	No exercise	503	83.33
Family history of AR	Yes	85	14.16
	No	515	85.83
Knowledge about AR	Yes	239	39.83
	No	361	60.17
Participants idea about AR	Increase nasal discharge and obstruction	143	23.83
	Sneezing and itching in nose	64	10.67
	Weakness, fatigue and decrease nasal smell	32	5.33

Table 3: Knowledge of participants about allergic rhinitis

Categories	Answer of participants	No.	%
Symptom of AR	Nasal discharge and nasal obstruction	105	17.5
	Sneezing and itching in nose	29	4.83
	Itching of the palate, lacrimation, decrease smell	18	3
	Fullness of the ear, conjunctival irritation, headache, weakness, fatigue	6	1
	No any knowledge	442	73.67
Complications	Asthma	19	3.16
	Eczema	29	4.83
	Urticaria	6	1
	Granular pharyngitis and laryngitis	13	2.2
	Know about all or some complications	3	0.5
	No knowledge	530	88.33

Table 4: Participant knowledge about risk factors management and prevention of allergic rhinitis

Categories	Answer of participants	Number	%
Knowledge of risk factors of AR	Positive family history	30	5
	Smoke	26	4.34
	Dust	46	7.67
	Cold	10	1.67
	Smog	25	4.17
	Drug reaction	24	4
	Mixed	33	5.5
	Not known	442	73.66
Treatment (knowledge)	Antihistamines (levocetirizine, Fexofenadine.	257	42.83
	Nasal decongest (xylometazoline)	104	17.34
	Topical corticosteroid (Fluticasone furoate)	113	18.83
	Immunotherapy	126	21
AR preventive measure (knowledge)	Allergen avoidance	139	23.16
	Removal of pet from house	37	6.16
	No smoking	15	2.5
	Restriction of outdoor activities in season of pollen	10	1.66
	Mixed	33	5.5
	Not Known	366	61

Table-5. Diagnosis based on nasal eosinophilia.

Sr. no	Nasal eosinophilia	No of cases	Percentage
1	+	18	27.28
2	++	29	43.94
3	+++	19	28.78
	Total	66	100

Discussion

This study was carried out to access the assessment of awareness and prevalence about allergic rhinitis in the north Bihar of India. Most of the people in that societies were illiterate (21.67%) or less educated (69.34%). A large population had heard about allergic rhinitis but its symptoms, complication, risk factors, and treatment known only to a few. In this study, we find that only 39.83% of participants knew about allergic rhinitis. When compared with the study of Adegbiji and Ajite found very low level of knowledge awareness, therefore it needs to improved awareness among people of rural and urban India.[7,8] Even very few percentages of educated groups were fully aware of this disease. A total of 600 participants (252male and 348 female) were chosen randomly. Only 9% population were highly educated (graduate or more). The prevalence of allergic rhinitis in the Muzaffarpur region was found to be 11%. This result match with a survey done by Sinha et al, that 11% population of south Delhi (Mehrauli) suffering from allergic rhinitis[10]. Our survey reflects that the occurrence of allergic rhinitis in Bihar is in rising condition.

The objective of this study was to survey the awareness and diagnosis of allergic rhinitis in this region and convey a message to the government and society that how many people were aware of such a hazardous epidemic disease. The data

simply shows that educated people were more aware of any disease than the least educated and the present study showed the percentage of high education was very low (9%) that's why the percentage of awareness for AR was also found low (60.17%). Education programs when designed should emphasis on awareness of such disease.[11] On basis of the awareness and knowledge on etiology of nasal allergy, majority of the patients were aware of micro-organisms as the main causes of nasal allergy followed by spiritual attack and least was by allergens.[12] This is contrary to our study in which most people think that dust is main causative agent followed by positive family history and smoke. Most people (73.66%) not knew about any risk factor. only 5.5% knew more than one risk factor. 17.5% responders knew that the most common symptom of AR was Nasal discharge and nasal obstruction. In a study it was found that 47.7% people aware about nasal blockage as a symptom of AR.[13] Most of the participants had only known that it was a type of disease and may be treated by antihistamines (42.83%). Similar finding was observed by Adegbiji.[13] Out of 600 subjects, 66 were suffering from allergic rhinitis based on nasal eosinophilia. Crobach et al. evaluate nasal smear eosinophilia for the diagnosis of allergic rhinitis.[14] Jirapongsananuruk. et al. conclude that the nasal cytology is a quick, simple and in- expansive tool not only for the diagnosis of allergic rhinitis but also for serial evaluations of children with this condition as well and also reported that nasal smear eosinophils have sensitivity of 91.7% and specificity of 100% in diagnosing allergic rhinitis. [15] Chandra et al, conducted comparative study of nasal smear and biopsy in patient of allergic rhinitis. This study concluded that biopsies were found to be better than smears and incidence of eosinophil and mast cell was found to increase with positive history of allergy in family, other of body, inhaled or food allergens and severity of obstruction.[16] Chen et al, found that the sensitivity of nasal eosinophil count as a diagnostic test for allergic rhinitis was 51.3% with a specificity of 88.5%, a positive predictive value of 87% and a negative predictive value of 54%. Eosinophilia in nasal biopsies was found in 44% and 30% of allergic patient and controls respectively.[17] There was no significant correlation between symptoms or positive skin test with either smear eosinophilia or tissue eosinophilia. The study carried out by Lans et al. suggested that the nasal smear for eosinophils is an insensitive but specific test for the diagnosis of allergic rhinitis. When patient with nasal polyposis sparing sensitivity and/or negative skin test are excluded.[18]

Conclusion

This cross-sectional study highlights a low level of awareness and inadequate knowledge regarding allergic rhinitis (AR) among the population of North Bihar, despite a notable prevalence rate of 11% confirmed through clinical symptoms and nasal cytology. The majority of participants were unaware of the symptoms, risk factors, complications, preventive measures, and appropriate management strategies of AR, with poor awareness being more pronounced among individuals with lower educational status. Although many respondents had heard of the disease, detailed understanding regarding its etiology, long-term complications such as asthma, and modern treatment options including immunotherapy was markedly deficient. The findings emphasize that education plays a pivotal role in disease awareness, and the existing knowledge gap may contribute to delayed diagnosis, improper treatment, and increased disease burden. The study also reinforces the utility of nasal smear eosinophilia as a simple, cost-effective, and practical diagnostic tool for large-scale community screening, particularly in resource-limited settings.

Declaration of Patient Consent: This is certified that patients were given consents for giving their history, examination and also given their consent for their clinical information to be published.

References

1. Bjorksten, B., Clayton, T., Ellwood, P., Stewart, A. and Strachan, D. (2008) ISAAC Phase III Study Group. Worldwide time trends for symptoms of rhinitis and conjunctivitis: Phase III of the international study of asthma and allergies in childhood. Pediatric Allergy Immunol; 19:110-124.
2. Akhouri, S. and House, S.A. (2021). Allergic Rhinitis. In: Stat Pearls [Internet]. Treasure Island (FL): Jan. Available: https:// www.ncbi.nlm.nih.gov/books/NBK538186/
3. Small, P., Keith, P.K. and Kim, H. (2018) Allergic rhinitis. Allergy Asthma Clin Immunol 14: 51. https://doi.org/10.1186/s 13223-018-0280-7
4. De Groot, E.P., Nijkamp, A., Duiverman, E.J., Brand, P.L. (2012). Allergic rhinitis is associated with poor asthma control in children with asthma. Thorax; 67:582-587
5. Aggarwal, A.N., Chaudhry, K., Chhabra, S.K., D'Souza, G.A., Gupta, D. and Jindal, S.K. (2006). Asthma Epidemiology Study Group. Prevalence and risk factors for bronchial asthma in Indian adults: a multi-center study. Indian J Chest Dis Allied Sci. Jan-Mar; 48(1):13–22.
6. Bielory, L. (2000). Allergic and immunologic disorders of the eye. Part II: Ocular allergy. J Allergy Clin Immunol; 106:1010-1032.
7. Adegbiji, W.A., Olajide, G.T., Olajuyin, A.O., Aremu, S.K. and Akanbi, G.O. (2018). Pattern

of allergic rhinitis among children in Ekiti, Nigeria. Int J Pediatr Otorhinolaryngol; 106:75-91.
8. Ajite, O.K., Adegbiji, W.A., Olajide, G.T., Olajuyin, A.O., Aremu, S.K. (2018). Clinico epidemiological pattern of allergic rhinitis in adults in Ado-Ekiti, Nigeria. Nigerian J Otorhinolaryngol; 16:13-21.
9. Ozala, K.; sipila, P; sorri, M. and Karma, P. (1982). Role of Allergy in Chronic Otitis Media. Acta Otolaryngologica., 93: 55.
10. Sinha, B., Vibha, S.R., Chowdhury, R. (2015). Allergic Rhinitis: A neglected disease - A community-based assessment among adults in Delhi. J Postgrad Med; 61:169-175
11. Zhao, J. (2004). Relationship of allergic asthma and allergic rhinitis. J Appl Clin Pediatirics.;19(4):1020– 1027.
12. Walker, S., Khan-Wasti, S., Fletcher, M., Cullinan, P., Harris, J., Sheikh, A. (2007). Seasonal allergic rhinitis is associated with a detrimental effect on examination performance in United Kingdom teenagers: Case-control study. J Allergy Clin Immunol; 120:381-387.
13. Adegbiji, W.A., Aremu, S.K., Aluko, A.A.A., Adewoye, R.K. (2020). Knowledge and awareness of nasal allergy among patients in a developing country. J Family Med Prim Care. 9(3):1477-1482.
14. Crobach, M., Hermans, J., Kaptein, A. (1996). Nasal smear eosinophilia for the diagnosis of allergic rhinitis and eosicophilic non-allergic rhinitis. Prism Health Care, 14(2):116-121.
15. Jirapongsananuruk, O., Vichyanond, P. (1998). Nasal cytology in the diagnosis of allergic rhinitis in children. Annals of Allergy, Asthma & Immunology. 80(2): 165- 170
16. Chandra, R., Aggarwal, A.K., Kohli, G.S., Jaiswal, T.S., Gupta, K.B. (2002). Comparative study of nasal smear and biopsy in patients of allergic rhinitis. Indian J Allergy Asthma Immunol.16:27-31.
17. Chen, Y., Yang, M., Deng, J., Wang, K., Shi, J., Sun, Y. (2020). Elevated Levels of Activated and Pathogenic Eosinophils Characterize Moderate-Severe House Dust Mite Allergic Rhinitis. J Immunol Res. doi:10.1155/2020/8085615
18. Lans, D.M., Alfano, N., Rocklin, R. (1989). Nasal eosinophilia in allergic & non allergic rhinitis usefulness of the nasal smear in the nasal smear and biopsy in allergic rhinitis 31 diagnosis of allergic rhinitis. Allerg Proceedings.10:275-280.