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Original Research Article

Prevalence and patterns of mite allergy in bronchial asthma patients visiting a tertiary care centre

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ABSTRACT

Background: Among obstructive respiratory conditions asthma has been frequently affecting individuals from all age groups. Events that lead to an asthma attack is an interplay of multifactorial factors between host and the environment. Earlier evidences have indicated that aeroallergens play a major role in the pathogenesis of asthma and needs further probing.

Aim of The Study: To identify the most common mites causing allergy and its prevalence in patients with bronchial asthma using skin prick test.

Materials and Methods: The study population included in this study were cases diagnosed as Bronchial Asthma on spirometry basis. The cases underwent a detailed history, physical examination, routine investigations and a Skin Prick Test (SPT). SPT for aeroallergens was done using CREDISOL kit and the reaction was observed in 15 mins, wheal diameters more than 3 mm were recorded as sensitization to the allergen and interpreted accordingly.

Results: The prevalence of Mite allergy was observed more in females when compared to males. Most common House Dust mite was found to be Dermatophagoides pteronyssinus (72.5%) followed by Dermatophagoides farinae (66.25%) and Blomia tropicalis (61.25%). Different patterns of sensitisation were observed. Either to a single mite, any two mites and all three mites.

Conclusion: The study concluded that D. pteronyssinus was the most common allergen in the study population of Bronchial Asthma.

1. Introduction

Asthma is a serious health issue globally with rising rates of occurrence in many developing and developed countries.[1] Previous research on asthma in India have found prevalence rates ranging from 2% to 23%.[2–4] Geographical locations, local traditions, customs, and environmental factors can all influence the contribution of numerous risk factors to asthma incidence[5–7]The skin is one of the largest immunologic organs, and it is a frequent target for allergic reactions, with a wide range of responses to allergic substances. When skin and clinical allergy was monitored we witnessed type I hypersensitivity reaction.Allergy testing by skin prick test (SPT) is all about sensitisation. It is minimally invasive, affordable, provides quick results, and is easy to repeat when performed by skilled healthcare professional. Skin prick testing is indicated if we are predicting type 1 allergy after obtaining history and clinical picture, the sensitivity to inhalants, food, medication, or occupational allergens can be assessed by

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SPT. As a result, SPTs offer objective proof of sensitivity. Significant sensitivity if observed needs deep assessment of the patient history to provide appropriate guidance towards the preventive measures. SPT can also be used to identify all sensitised individuals in a population or to screen for atopic illness propensity using a restricted set of allergens.

SPT is used to assess adults and children. When symptoms change or new environmental allergens are detected, repeat testing may be required to detect new sensitizations, especially in youngsters.

House dust mites (HDM) are the most prevalent cause of indoor allergies, according to multi-centre research undertaken in Europe, the United States, Asia, South America, New Zealand, and Australia. HDM sensitisation has also been recorded in Africa.[8,9] Dust particles that come from mite faeces or decomposing mite remains carry mite proteins, or mite allergens, which adhere to them and cause sensitization and symptoms.[10]

Dermatophagoides Pteronyssinus, Dermatophagoides Farinae, and Euroglyphusmaynei are the most common species (family: Pyroglyphidae). In tropical and subtropical environments, D. Pteronyssinus and Blomia tropicalis (family Glycyphagidae) are the most prevalent species, whereas D. Farinae is rare.[11]

Dust mites (Dermatophagoides Farinae and Dermatophagoides Pteronyssinus) and their allergens have been linked to asthma, allergic rhinitis, atopic dermatitis. House dust mites are widespread in the homes of asthma sufferers in humid geographic locations where ambient relative humidity exceeds 70% for lengthy periods of time.[12]

2. Materials and Methods

An Observational cross-sectional study was carried out in Department of Respiratory Medicine, Dhiraj Hospital, Piparia, Vadodara. The institutional review board and ethical panel of the university gave their approval before the study could be carried out. Patients who had visited the research institute, the out-patient department and/or those who were admitted in the in-patient department of Respiratory Medicine, already diagnosed as bronchial asthma on spirometry basis were enrolled in the study. Initial workup of the patients included a comprehensive history taking, systematic examination and basic documentation of the details. Participants were subjected to the basic blood tests and other specific investigations. Patients who were diagnosed with bronchial asthma, were explained and informed in their own language regarding the test to be conducted and the risks and benefits of the same. Informed consents were obtained from the patients and relative for the skin prick test procedure. Skin prick test was performed and interpreted, a wheal diameter of more than 3 mm was considered as sensitization to the allergen, the results were reviewed and the allergy sensitisation noted accordingly.

In the study, a Credisol Allergen kit was used for the procedure.

2.1. Study design

Observational Cross-sectional study.

2.2. Study site

OPD and IPD, Department of Respiratory Medicine, Dhiraj Hospital, Vadodara.

2.3. Study population

Diagnosed cases of Bronchial Asthma who visited outdoor department and was indoored in Pulmonary Medicine Department of Dhiraj Hospital Vadodara; was examined and detailed history taken, blood investigations done and after explaining the procedure in detail, a consent was obtained for the skin prick test procedure from candidates who fulfilled the specified criterias.

2.4. Inclusion criteria

1. Diagnosed cases of Bronchial asthma.
2. Patients who had given written informed consent.
3. Those who underwent the investigation /procedure after detailed explanation.

2.5. Exclusion criteria

1. Patients aged below 12 years and 80 years or more.
2. Intake of drugs within last 3 days; drugs that could affect the SPT result (antihistamines, corticosteroids, etc.).
3. Earlier event of any dermatographism.
4. The presence of extensive skin lesions.
5. Currently taking / have taken allergen immunotherapy.
6. Patients who refused to give written informed consent.

2.6. Study period

One and a half years.

2.7. Sample size

Diagnosed cases of Bronchial asthma who provided consent for allergy testing.

2.8. Statistical methods used

Statistical analysis was done by methods like descriptive statistics, chi- square / contingency coefficient analysis, the sample t-test. SPSS for windows (version 16.0) was used for logistic regression.

2.9. Graphical representation of data

To create many kinds of graphs, including scatter plots, pie charts, and bar diagrams, Microsoft Word and Excel were utilised.

P-value: After assuming all rules of statistical test, p value (Probability that the result is true) of <0.05 was considered to be statistically significance.

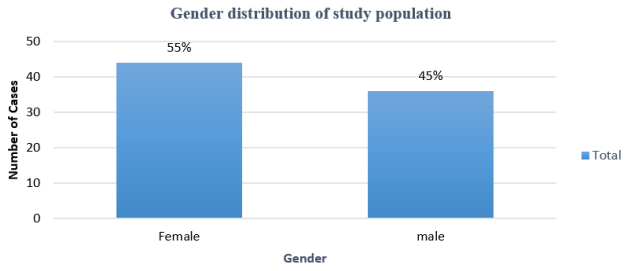
2.10. Statistical software

For data processing, SPSS version 22 was used.

3. Results

The purpose of the study was to test the sensitivity pattern for mites in already diagnosed cases of bronchial asthma who visited our health care setting after interpreting the skin prick test results in a study population of 80 individuals which included 44 females and 36 males. There were thirty males who tested positive for mite allergy, compared to 38 females who tested positive. (Table 1). Sensitivity to any one mite was observed in 68 bronchial asthma patients.

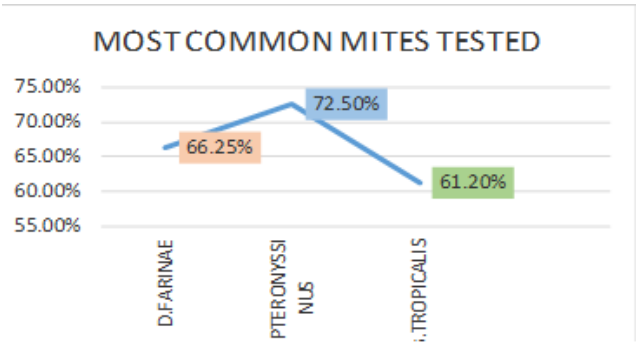
Sensitisation was found to be highest with D. Pteronyssinus (72.50%) followed by D. Farinae (66.25 %) and Blomia Tropicalis (61.25%). (Graph 2). The study observed that the most prevalent Mite was D. Pteronyssinus which had a P value which was significant <0.005. The skin test performed was yielding a positive results for one or more mites and for a few study subjects it was noted that they were sensitized to all three mites when interpreted after the SPT. D.Pteronyssinus and B. Tropicalis had a skin prick test positivity in 7 cases (8.75 %), D.Farinae and D.Pteronyssinus was seen to yield a positive interpretation after SPT in 11 candidates (13.75%).Out of 80 cases, it was observed that 46.25 percent had sensitisation to all 3 mites respectively (Figure 2)



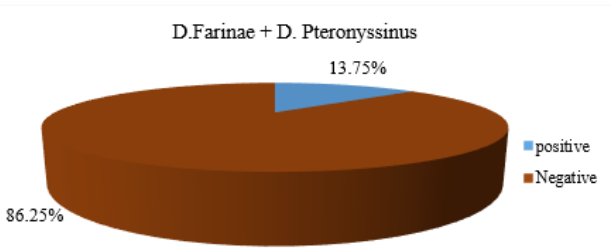
Graph 1: Bar diagram showing gender distribution of subjects with asthma

4. Discussion

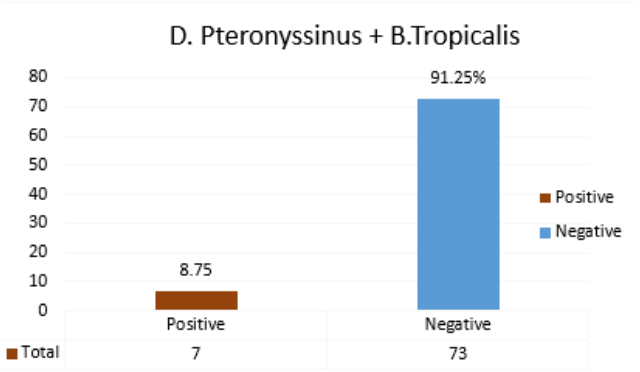
It has been observed that aero-allergens play a major role in pathogenesis of bronchial asthma. Based on geographical area the type of aero – allergens involved in the process of



Graph 2: Line diagram showing mite sensitivity



Graph 3: Pie Chart Depicting Sensitisation to D.Farinae & D.Pteronyssinus



Graph 4: Pie Chart Depicting Sensitisation to d.farinae + b.tropicalis

Table 1: Mite sensitisation patterns observed in bronchial asthma patients

Gender	Positive response	Negative response	Grand Total	%
Female	38	6	44	55%
male	30	6	36	45%
Grand Total	68	12	80	100%

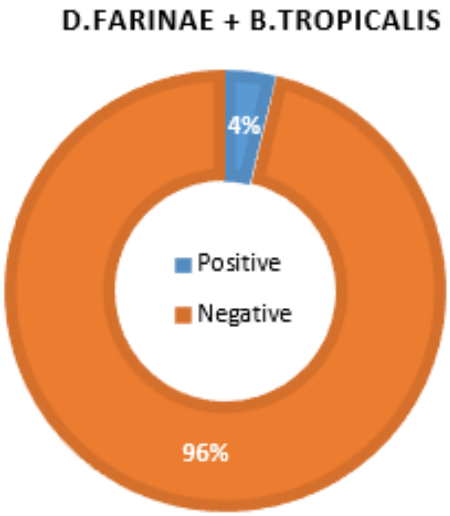


Figure 1: Bar Diagram depicting sensitisation to D.Pteronyssinus + B.Tropicalis

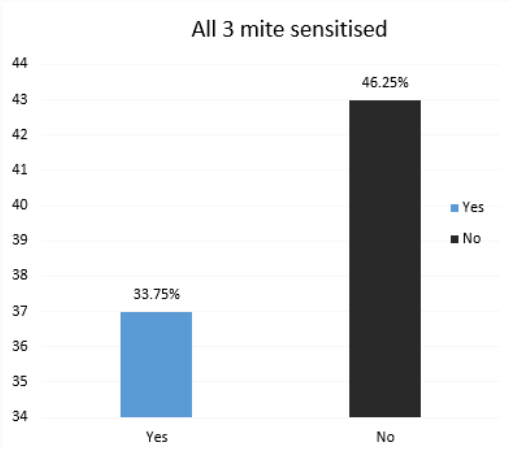


Figure 2: Bar diagram for all 3 mite Sensitised cases

triggering an asthma are different.

4.1. Prevalence of dust mite allergy in bronchial asthma patients

Out of the 80 participants recruited in the study, 78 had a positive skin prick test.

Studies conducted in 4 regions of China by Li J et al , which included a study group of 6304 cases, it was observed that SPT response for any one aeroallergen was seen in 4545 (72.1%), Similar to this, our study examined 80 cases of bronchial asthma that had been diagnosed. The Skin Prick Test Sensitization to Mites, which was conducted on the study group, revealed the following pattern: 68 patients, or 85% of the total number of patients included in the study, had positive results for Dust Mite, indicating that aeroallergens are important in initiating the pathophysiology of asthma.

In our study -The most common mite was found to be D.Pteronyssinus 72.50% followed by D. Farinae 66.25 % and Blomia Tropicalis 61.25 %. In a study of individuals with bronchial asthma and allergic rhinitis, Ediger D et al. found that the most prevalent aeroallergens were Dermatophagoides Farinae (50%) and D. Pteronyssinus (44%).[13–15] A study on aeroallergens in office workers in Malaysia found that workers were sensitised to D. Pteronyssinus and D. Farinae house dust mites in 50.3% and 49% of cases, respectively. This finding was consistent with our investigation, which found that D. Pteronyssinus was the most common allergen in house dust mites. In the Malaysian study, the majority of participants—90%—were sensitised to at least one allergen, and it was found that they had reacted to Blomia tropicalis (62%) and home dust mites (66%). Additionally, in our investigation, 97.5% of the participants tested positive for at least one aeroallergen.[16] Mites vary according to variations in the environment and D.Pteronyssinus was more prevalent in this Indian setting which has a tropical climate.

Our study observed sensitisation to more than one mite and many showed sensitization to all three mites included in the study. D.Farinae and D.Pteronyssinus was seen to yield a positive interpretation after SPT in 11 candidates (13.75%), D.Farinae and B.Tropicalis was tested positive in 3 patients from the study group which is (3.9%.) D.Pteronyssinus and B. Tropicalis had a skin prick test positivity in 7 cases (8.75%), Out of 80 cases, it was observed that 46.25 percent had sensitisation to all 3 mites respectively. This might suggest that there is cross reactivity for mites in the population studied.

5. Conclusion

Dust mite is one of the most prevalent aero-allergen and identified as an emerging worldwide problem which can be prevented by appropriate measures for mite control. Through skin prick testing, we can detect patterns related to aeroallergens. By examining the panel of allergens that test positive, we can develop preventive measures that can be taken to avoid the allergens. We can schedule further care based on our understanding of this situation. The skin prick test is useful for both determining the prognosis of treatment and serving as a guiding tool for immunotherapy. As to the GINA guidelines of 2021, allergy immunotherapy, or AIT, is a non-pharmacological approach that can be used to manage symptoms, minimise future risks, optimise medication use, and even guarantee a drug-free life through suitable preventive measures.

6. Source of Funding

None.

7. Conflict of Interest

None.

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