

Blomia Tropicalis (House Dust Mite) Sensitisation in Childhood asthma

**Dr. Sunil Kumar¹, Dr. Ghanshyam Swami^{2*}, Dr. Rivneet Kaur¹, Dr. Vijendra Kumar Garg³,
Dr. Abhishek Kasera⁴, Parth Swami⁵,**

¹Junior Resident Doctor, Department of Pediatric Medicine, Sawai Mansingh Medical College,
Jaipur, Rajasthan, India

²Associate Professor, Department of Pediatric Medicine, Sawai Mansingh Medical College, Jaipur,
Rajasthan, India

¹Junior resident Doctor, Department of Pediatric Medicine, Sawai Mansingh Medical College,
Jaipur, Rajasthan, India

³Assistant Professor, Department of Pediatric Medicine, Sawai Mansingh Medical College, Jaipur,
Rajasthan, India

⁴Resident doctor, Department of Pediatric Medicine, Sawai Mansingh Medical College, Jaipur,
Rajasthan, India

Undergraduate student, Shri Kalyan Government Medical College, Sikar, India

Corresponding author - gswami1974.gs@gmail.com

Abstract:

Objective: To Identify house dust mite (*Blomia Tropicalis*) Sensitisation by Skin prick test in children with Asthma.

Methods: In this observational study, Children between 5-15 years with Pediatric Asthma were enrolled to undergo skin-prick testing. Sensitivity was checked for *Blomia Tropicalis*.

Results: Total 100 Children underwent skin-prick test; 20 (20%) showed significant positivity to *Blomia Tropicalis*. In the HDM sensitized group, a positive family history of allergic disorders was present in 56 children (56%).

Conclusion: Sensitization of *B. Tropicalis* in asthmatic children between 5-15 years of age was a significant number.

Key words: *Blomia Tropicalis*; House dust mite; Skin-prick test (SPT)

INTRODUCTION

Allergic Diseases, including allergic rhinitis, atopic dermatitis, and Asthma, are the greatest prevalent chronic immunological diseases that affect children and adults. The interactions that take place

between developmental factors and environmental components play a crucial role in their pathogenesis [1]. According to the site of contact with the allergen, different clinical manifestations may develop in the airways, skin, or gastrointestinal tract.

Allergic asthma is the most common type of asthma. In allergic asthma the symptoms are generally: Cough, Wheeze, Shortness of breath, Fast breathing, Chest tightness. House Dust Mite, is one of the most common and important indoor allergen.

House dust mite allergy is an allergic reaction to tiny bugs that commonly live in house dust. Signs of dust mite allergy include those common to hay fever, such as sneezing and runny nose. Many people with dust mite allergy also experience signs of asthma, such as wheezing and difficulty breathing [2] [3] [4].

House dust mites like *Dermatophagoide farinae*, *Dermatophagoid pteronyssinus* and *Blomia tropicalis* are important and major cause of allergic sensitisation in allergic asthmatic children. Data for sensitivity to *Dermatophagoide farinae* and *Dermatophagoid pteronyssinus* are available in India but data for *Blomia tropicalis* sensitisation are lacking. We found only one study for the *Blomia tropicalis* sensitisation in south India but in north India we could not find any study regarding *Blomia Tropicalis* sensitisation. So this study was planned to find out the *Blomia tropicalis* sensitisation in asthmatic children.

MATERIAL AND METHODS

The study was conducted in the department of Pediatric Medicine, at tertiary care center of North west India. Data was collected between June 2020 to May 2021. This was a hospital based Observational Study. Children between 5 to 15 years of age with either sex, diagnosed to have Asthma as per GINA guidelines 2018, were enrolled for this study.

The informed written consent of the parent or guardian was taken. Ethical clearance was taken from the institutional ethics committee before the start of this study.

Inclusion Criteria: Children aged between 5-15 years with Asthma (GINA guidelines 2018).

Exclusion Criteria:- Patients who had any known Immuno-compromised state or any form of malignancy, Children who were on any form of antihistamines, Beta-blockers or any other immunosuppressant drug within 96 hours preceding the Skin prick test, were excluded from this

study. Children having severe Atopic dermatitis or Eczema and Children having Dermatographism were also excluded from this study.

METHODOLOGY

A total of 100 children were taken as study samples. The detailed history and clinical examination was done and findings were noted in pre-designed proforma.

Method:

The Modified Skin prick test was performed after cleaning the skin with Normal Saline and a 3mm lancet was used for piercing through a drop of allergen extract placed over the skin. The skin was pierced at an angle of 45 degree into the epidermis and slightly bevelled upwards producing a pricking sensation, so as to allow an adequate entry of the antigen beneath the stratum corneum. For this skin-prick test, the volar aspect of the forearm was selected. The site was observed after 15 -20 minutes for wheal.

A wheal of ≥ 3 mm diameter is regarded as positive. 10mg/ml Histamine hydrochloride was taken as positive control and buffered saline was taken as negative control. Blomia Tropicalis test solution of 1.0 ml vial containing 1500 PNU/150 mcg was used for the skin-prick test, which was procured from the CREDISOL Creative Diagnosis Medicare Pvt. Ltd, Mumbai.

Statistical Analysis- Data was collected and all statistical analysis was done using SPSS software version 21.0 (Chicago, Illinois) and a 'P' value of < 0.05 was taken as significant

RESULTS

Baseline demographic data are given in [Table 1]. Which shows, Mean age of 10 years and Male-female ratio of 2.1. Family history of atopy was present in 56%.

Table 1: Baseline demographic data

| | |
|--------------------------------|---------------------|
| Mean age | 10 years |
| Male:female ratio | 2.1 |
| Family history of Atopy | 56% of cases |

Distribution of study children according to B. Tropicalis skin prick test results are depicted in Table 2. Out of total 100 asthmatic children, 20 (20%) were sensitized to B. Tropicalis .

Table 2: Distribution of study children according to B. Tropicalis skin prick test results

| B. Tropicalis skin prick test | Frequency | Percent |
|--------------------------------------|------------------|----------------|
| Positive | 20 | 20.0 |
| Negative | 80 | 80.0 |
| Total | 100 | 100.0 |

Distribution of study children with B. Tropicalis sensitization according to age groups is depicted in Table 3, which shows out of 100 children 75 (75%) were in the age group of 5-10 years and 25 (25%) were in the age of 10-15 years.

Table 3: Distribution of study children with B. Tropicalis sensitization according to age group:

| Age | Total Number | B. Tropicalis skin prick test | | | | p-value |
|---------------------|---------------------|--------------------------------------|--------------|-----------------|--------------|----------------|
| | | Positive | | Negative | | |
| | | Count | % | Count | % | |
| 5-10 years | 75 | 14 | 18.7% | 61 | 81.3% | 0.564 |
| >10 years | 25 | 6 | 24% | 19 | 76% | |

Among 75 children in the age group of 5-10 years, 14 (18.7%) Children were positive for Blomia Tropicalis skin-prick test. Among 25 children of the age group of 10-15 years, 6 (24%) Children were positive for Blomia Tropicalis Skin-prick test. However these differences were not statistically significant.

Out of a total 100 children, 56 (56%) were having a family history of atopic disease. Out of which,

15 (26.78%) were sensitized to *Blomia Tropicalis*. Out of the remaining 44 children who were not having family history of atopic disease, only 5 (11.36%) were positive for *Blomia Tropicalis* sensitisation and this difference was statistically significant [Table 4].

Table 4: Distribution of study children according to B. Tropicalis sensitization and Family history of atopic disease

| Family history of Atopic disease | Total Number | B. Tropicalis skin prick test | | | | p-value |
|----------------------------------|--------------|-------------------------------|--------------|-----------|--------------|---------|
| | | Positive | | Negative | | |
| | | Count | % | Count | % | |
| Yes | 56 | 15 | 26.78% | 41 | 73.21% | 0.0001 |
| No | 44 | 5 | 11.36% | 39 | 88.63% | |
| Total | 100 | 20 | 20.0% | 80 | 80.0% | |

Out of 100 children, 75 were in the age group of 5-10 years and 25 were between the 10-15 years of age. The mean age of the children in our study was 10 years.

DISCUSSION

Okasha et al⁵ included patients with mean age of 11.40 ± 2.82 years. However this study did not categorise the patients according to age group.

Doshi et al⁶ did a study of house dust mite (*Dermatophagoide farinae*, *Dermatophagoid pteronyssinus* and *Blomia tropicalis*) sensitization in Mumbai but they included a total 90 children aged from 9 months to 46 months only. We couldn't find any other study in India depicting *Blomia Tropicalis* sensitisation in children.

An aeroallergen sensitization study of childhood asthmatics was done in Allahabad city by Raj et al⁸. 2013 and found that 180 children above 5 years of age exhibited 7.8% sensitivity to HDM (*Dermatophagoides farinae*) allergens. But, this study included only *Dermatophagoide farinae*, *Dermatophagoid pteronyssinus*.

In 2011, a HDM sensitization study depicted 52.5%, 46.0% and 19% SPT reactivity for Dp, Df and *B. Tropicalis* respectively in the Bangalore region.⁹ But, this study was performed on 139 adult bronchial asthma patients rather than children.

Doshi and Tripathi et al⁶ 2016, conducted a study in the city of Mumbai. A SPT-based investigation was performed to identify HDM sensitivity in children with Allergic asthma. A total of 92 children underwent an SPT. Forty nine (53.2%) showed significant positivity to one or more dust mites. Although the most common sensitization was *D. pteronyssinus* followed by *D. farinae* and *B. Tropicalis* sensitization was seen in 12.2% children only in comparison to 20% sensitization seen in our study. The minor difference in sensitization can be due to climatic and geographical differences of the study population.

Susanto AJ et al⁷ found that prevalence of sensitization was 62.1% for *D. farinae*, 51.7% for *D. pteronyssinus*, and 48.3% for *Blomia Tropicalis*. The age group for this study was 19-59 years and was conducted in Indonesia. In this study there was a high rate of *B. Tropicalis* sensitization in comparison to our study.

HDM prevalence study was done in Delhi and Allahabad during 2008–2011 by (Kumar et al. 2012).¹⁰ SPT was performed on 4263 patients consisting of 2361 (55.38%) males and 1902 (44.62%) females, with a mean age of 30.06 years for 58 types of aeroallergens. However there were 110 of 4263 patients lying less than 10 years and 772 patients were between 11-19 years. Significant skin positive reaction (2 + and above) against aeroallergens was found in 76 children of less than 10 years and 341 of age group 11-19 years. In this study HMD was the second most common aeroallergen to present a significant skin-prick test.

In our study, out of 20 positive children, 14 (70%) were in age of 5-10 years and 6 (30%) were in the age group of 10-15 years while out of 80 negative children, 61 (76.3%) were in age of 5-10 years and 19 (23.8%) were in age above 10 years. However, this difference was not found to be statistically significant.

Doshi et al⁶ found that a large proportion (64.28 %) of young children with Allergic asthma were sensitized to HDM and early sensitization to HDM is a well-documented risk factor for later asthma. In our study, out of a total 100 children, 56 (56%) were having a family history of atopic disease. Out of which, 15 (26.78%) were sensitized to *Blomia Tropicalis*. Out of the remaining 44 children who were not having family history of atopic disease, only 5 (11.36%) were positive for *Blomia Tropicalis* sensitisation and this difference was statistically significant.

CONCLUSION

We infer by our study that sensitization to *B. Tropicalis* in asthmatic children between 5-15 years of age was 20% which is a significant number and those having positive family history of atopic disease

were having more chances of *Blomia Tropicalis* sensitization, so *Blomia Tropicalis* should form part of allergy panel investigating aeroallergen sensitization in the Asthmatic Children. Otherwise a large chunk of patients with *Blomia tropicalis* sensitisation will be missed.

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