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## Assessment Of The Cause Of Recurrent Wheeze In Children Aged 5 To 15 Years By Skin Prick Test.

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### ABSTRACT

The objective of this study was to assess the cause of recurrent wheeze in children aged 5 to 15 years using skin prick test. A descriptive study was conducted at KIMS hospital, Bangalore over a period of two years. The study population consisted of school children aged 5 to 15 years who had recurrent wheeze. Convenience sampling was used to select a sample size of N=45. Data collection was done using blood investigations and skin prick tests. Descriptive statistics were used for statistical analysis. The study found that 39.1% of wheezing episodes occurred in winter season. A strong correlation was observed between family history of asthma and allergy (61%). The absolute eosinophil count was increased in 95.6% of children. Skin prick test results showed that 88% of children were tested positive, while the rest were negative. The most common allergens were dust mites (63%) and pollen (8.6%). The study concluded that skin prick test is an effective method for identifying the cause of recurrent wheeze in children aged 5 to 15 years. The results of this study can be used to guide the diagnosis and management of recurrent wheeze in children.

**Keywords:** recurrent wheeze, children, skin prick test, asthma, allergy.

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## INTRODUCTION

Recurrent wheezing is a common respiratory symptom in children, and it can be a sign of underlying asthma or allergies [1]. Asthma is a chronic inflammatory disorder of the airways, and allergies are a common trigger for asthma symptoms. Skin prick tests (SPTs) are a widely used diagnostic tool to identify allergic triggers in children with asthma and recurrent wheezing [2]. SPTs involve applying a small amount of allergen extracts to the skin and then pricking the skin to allow the allergen to enter the skin. The skin is then observed for signs of an allergic reaction, such as redness or swelling [3].

SPTs are a safe and reliable method of identifying the presence of allergic sensitization and can help guide treatment decisions for children with recurrent wheezing. There is a growing body of evidence supporting the use of SPTs in the assessment of the cause of recurrent wheezing in children aged 5 to 15 years. SPTs can help identify specific allergens that trigger asthma symptoms, such as pollen, dust mites, or animal dander. This information can guide the development of an individualized treatment plan for each child, including environmental control measures, pharmacologic therapy, and allergen-specific immunotherapy [4]. Use of SPTs in the assessment of recurrent wheezing in children can help improve the diagnosis and management of asthma and allergies, and ultimately improve the quality of life for affected children and their families [5-8]. With this objective present study was planned to study of assessment of cause of recurrent wheeze in children of age between 5 to 15 years by skin prick test.

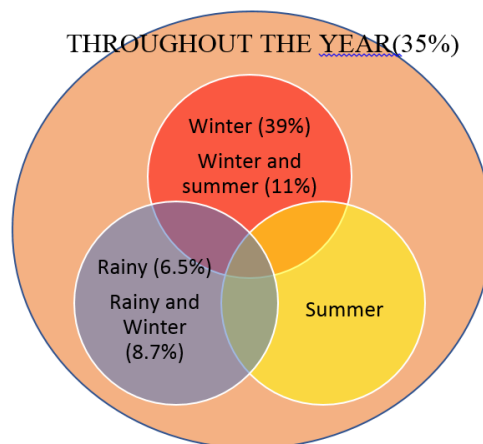
## MATERIAL AND METHODOLOGY

The study was conducted in KIMS hospital, Bangalore over a period of two years using a descriptive study design. The study population consisted of school children in the age group of 5 to 15 years who had recurrent wheeze, with wheezing episodes of more than three in a year or at least one episode in the last 12 months, meeting the inclusion criteria. The exclusion criteria included immunocompromised patients and wheeze associated with infections.

The study protocol was submitted to the ethical committee of Kempegowda Institute of Medical Sciences, and clearance was obtained before the study commenced. Convenience sampling was used to select a sample size of N=45. Data collection was done in children fulfilling the inclusion and exclusion criteria. The children were subjected to blood investigations and skin prick tests using MEDIPOINT lancet, which was used to prick through the allergen extract and driven into the superficial layers of the skin by means of a gentle prick. Descriptive statistics such as percentages and proportion were used for statistical analysis. Details of the data collection procedure are presented in the supplementary file.

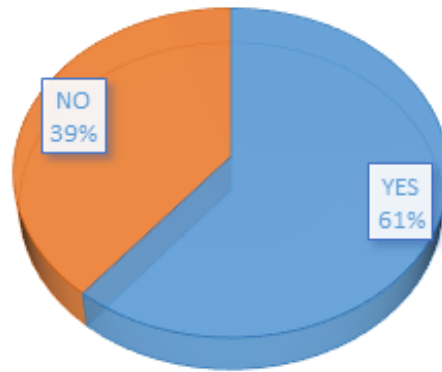
## RESULTS

Figure No 1: Seasons



Wheezing episodes in the children was 39.1% in winter season

**Figure 2: Family History**



In our study, there is a strong correlation with 61% of family history of asthma and allergy.

**Table 1: Absolute Eosinophil Count**

Parameter	Mean	SD	Minimum	Maximum
AEC	570	153	308	1100

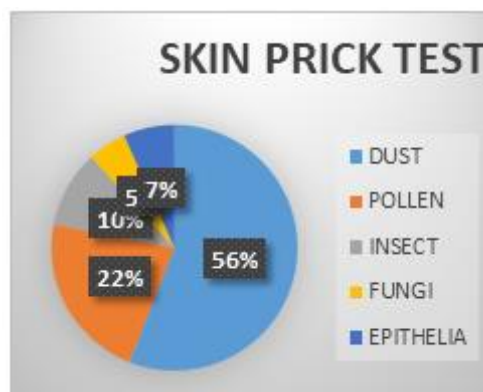
Absolute eosinophil count is increased in 95.6% of children

**Figure 3: Skin Prick Test**



In this study , children were subjected to skin prick test and was observed that 88% of the children were tested positive and the rest 12% were negative

**Figure 4: Dust, Pollen, Insect, Epithelia and Fungi**



**Table 2: Dust, Pollen, Epithelia, Fungi**

<b>Exposure</b>	<b>Number</b>	<b>Percentage</b>
<b>Dust Mite</b>		
Dermatophagoides Farinae (DF)	29	63
Dermatophagoides Pteronyssinus (DP)	25	54.3
<b>Dust plain</b>		
cotton dust	16	34.7
Hay dust	10	21.7
Wheat dust	3	6.5
Paper dust	4	8.6
House dust	10	21.7
<b>Pollen</b>		
Ageratum conyzoides	5	10.8
Azadirachta indica	4	8.6
Cassia siamea	2	4.34
Chenopodium album	2	4.34
Cocos nucifera	4	8.6
Cynodon dactylon	3	6.5
Carica papaya	2	4.3
Parthenium hysterophorus	8	17.4
Peltophorum pterocarpum	6	13
Prosopis juliflora	4	8.6
Ricinus communis	0	0
Holopteflea integrifolia	2	4.3
<b>Insect</b>		
Ant ( black)	2	4.3
Cockroach	5	10.9
Cricket	1	2.1
Grass hopper	3	6.5
Honey bee	1	2.1
House fly	2	4.3
Moth	1	2.1
Rice weevil	1	2.1
Wasp	1	2.1
Mosquito	6	13
<b>Epithelia</b>		
Pigeon droppings	4	8.6
<b>Fungi</b>		
Alternaria alternata	3	6.5
Aspergillus flavus	1	2.1
Aspergillus fumigatus	1	2.1
Aspergillus niger	2	4.3
Candida albicans	1	2.1

**DISCUSSION**

Our study aimed to assess the causes of recurrent wheezing in children aged 5 to 15 years through skin prick testing. The results showed that 39.1% of wheezing episodes occurred during winter, which is consistent with previous studies. A strong correlation was observed between family history of asthma and allergy in 61% of the children. This finding highlights the role of genetics in the development of asthma and allergic conditions. The absolute eosinophil count (AEC) was increased in 95.6% of the children. Eosinophils are a type of white blood cells that are commonly associated with allergic reactions and asthma. The increase in AEC indicates an allergic component in the pathogenesis of recurrent wheeze in these children.

Skin prick testing was performed on all children, and 88% of them tested positive. The most common allergens were dust mites, pollen, and insect allergens. The high prevalence of positive skin prick tests highlights the importance of identifying and avoiding triggers that can exacerbate wheezing in these children. Henderson J et al found [9], the strongest associations with atopy and airway responsiveness were found for intermediate onset (18 months) wheezing (OR for atopy 8.36, 95% CI 5.2 to 13.4; mean difference in dose response to methacholine 1.76, 95% CI 1.41 to 2.12 %FEV<sub>1</sub> per mumol, compared with infrequent/never wheeze phenotype). Late onset wheezing (after 42 months) was also associated with atopy (OR 6.6, 95% CI 4.7 to 9.4) and airway responsiveness (mean difference 1.61, 95% CI 1.37 to 1.85 %FEV<sub>1</sub> (1) per mumol). Transient and prolonged early wheeze were not associated with atopy but were weakly associated with increased airway responsiveness and persistent wheeze had intermediate associations with these outcomes. He concluded, wheezing phenotypes most strongly associated with atopy and airway responsiveness were characterised by onset after age 18 months.

The majority of children subjected to skin prick test were positive for dust mites which contributed for 71.7%, pollen for 28.3% and insects for 13%. This is similar to a study done by Wickens et al [10] where the most common indoor allergens were house dust mite and cat. In the developing country, it is important to create awareness about the risk factors for wheeze such as allergens, pollutants, pets, insects etc. parents should be educated about the prophylactic measures to be taken during the winter season awareness and about the different modalities of management. This will reduce the recurrence of wheeze to a greater extent and thereby retard the progression to asthma. In a country like INDIA Introduction of yearly FLU vaccine in a regular vaccination schedule by the government will reduce the burden of recurrent wheeze due to certain viruses to a greater extent. Thus, results of this study are consistent with previous studies that have shown the importance of allergen sensitization in the development of asthma and recurrent wheezing. The study's strength lies in the use of skin prick testing to identify specific allergens that can be avoided or treated to prevent exacerbations of wheezing.

### CONCLUSION

In conclusion, our study found that recurrent wheezing in children aged 5 to 15 years is often associated with allergen sensitization, particularly to dust mites, pollen, and insect allergens. Identifying and avoiding these triggers can be an effective strategy for preventing exacerbations of wheezing in these children. Our study highlights the importance of using skin prick testing to identify specific allergens and develop targeted treatment plans for children with recurrent wheezing like immunotherapy which is used to desensitize the causative allergen.

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