

## Original Research Article

# Predictive prevalence of asthma in children with allergic rhinosinusitis

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## ABSTRACT

**Background:** Asthma is one of the most common chronic diseases of childhood. In India - prevalence is 10% to 15% in 5-11 year old children according to the World Health Organization (WHO) statistics. Many of these children go on to develop asthma but the ability to predict school-age asthma based on early life characteristics is currently limited. Early identification of these children at risk will help in reducing respiratory complications later in life. Asthma predictive index (API) - one of the first rule-based predictive models for early identification of children at high risk of subsequent asthma was described by Castro-Rodríguez et al based on the Tucson children's respiratory study. Objectives of the study were to predict the prevalence of subsequent development of asthma in children with allergic rhinosinusitis using modified asthma predictive index (mAPI).

**Methods:** This cross-sectional observational study was done in 100 children of age  $\leq 3$  years of either gender who visited department of ENT, Saveetha Medical College. Demographic details and the mAPI questionnaire filled by the parent were obtained.

**Results:** Thirteen percent of the children had positive mAPI score, of which 14% (n=8) were male and 12% (n=5) were female children. Majority of them 77% had positive major criteria and 23% of them had positive minor criteria. Our study shows that 13% of these children who were included in the study will most likely develop asthma in their childhood and adult years.

**Conclusions:** A positive mAPI substantially increases probability of future asthma. mAPI's high predictive ability after a positive test can have clinical value for identifying children at risk of asthma. This study may help clinicians better to identify these at-risk children.

**Keywords:** Predictive prevalence of asthma, Asthma predictive index, Modified asthma predictive index

## INTRODUCTION

Asthma is one of the most common chronic diseases of childhood. Up to 50% of children wheeze at least once during the preschool years.<sup>1,2</sup> In India, prevalence is 10% to 15% in 5-11 year old children according to World Health Organization (WHO) statistics. Many of these children go on to develop asthma but the ability to predict school-age asthma based on early life characteristics is currently limited.<sup>2</sup> Early identification of these children at risk will help in closer monitoring for the development of asthmatic symptoms and may be important in reducing

respiratory complications later in life.<sup>3</sup> They may be ideal candidates for prevention strategies or intervention. Asthma predictive index (API), one of the first rule-based predictive models for early identification of children at high risk of subsequent asthma was described by Castro-Rodríguez et al based on the Tucson children's respiratory study.<sup>4</sup>

### Objective

The objective of the study was to predict the prevalence of subsequent development of asthma in children with

allergic rhinosinusitis using modified asthma predictive index (mAPI).

**METHODS**

Institute ethics committee approval was taken before commencing the study.

**Type of study**

It was a cross-sectional observational study.

**Study period**

The duration of the study was from January 2018 to June 2018.

**Sample size**

The study consisted of 100 children.

**Place**

The study was conducted in the department of ENT, Saveetha Medical College.

**Inclusion criteria**

Children of age  $\leq 3$  years of either gender with symptoms of allergic rhinosinusitis were included in the study.

Demographic details and the mAPI questionnaire filled by the parent was obtained.

Data are analysed using GraphPad InStat and expressed as descriptive statistics.

Appropriate non-parametric tests are used to compare between the genders.

The following criteria listed in Figure 1 was used for mAPI.<sup>2</sup>

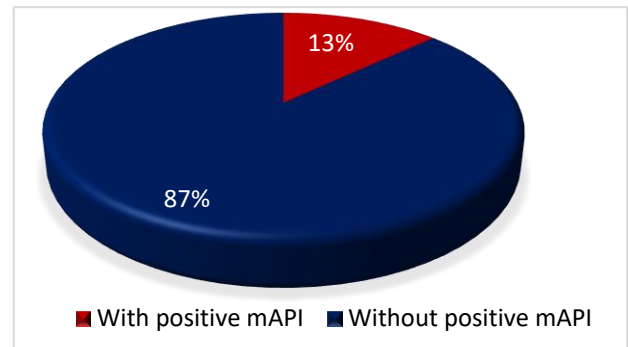
Criteria for stringent API and mAPI

<b>Stringent API</b>			
<i>Primary</i>	Early frequent wheezer ( $\geq 3$ on 1-5 rating scale)		
AND			
<i>Secondary</i>	At least 1 major:	OR	At least 2 minor:
	Parental physician-diagnosed asthma		Wheezing unrelated to colds
	Physician-diagnosed atopic dermatitis		Eosinophils $\geq 4\%$ in circulation
			Physician-diagnosed allergic rhinitis
<b>mAPI</b>			
<i>Primary</i>	$\geq 4$ wheezing episodes in a year		
AND			
<i>Secondary</i>	At least 1 major:	OR	At least 2 minor:
	Parental physician-diagnosed asthma		Wheezing unrelated to colds
	Physician-diagnosed atopic dermatitis		Eosinophils $\geq 4\%$ in circulation
	Allergic sensitization to at least one aeroallergen		Allergic sensitization to milk, egg, or peanuts

**Figure 1: Criteria listed for mAPI.**

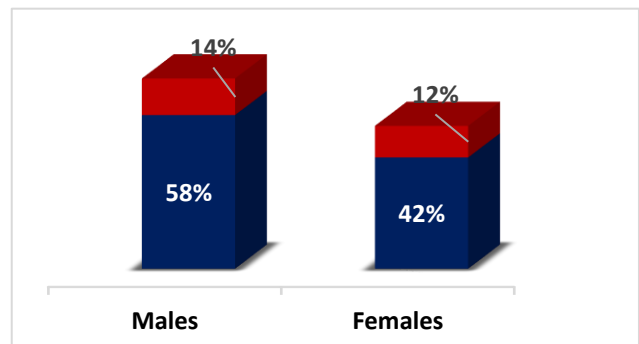
**RESULTS**

Figure 2 shows that 13% of the children had positive mAPI score.



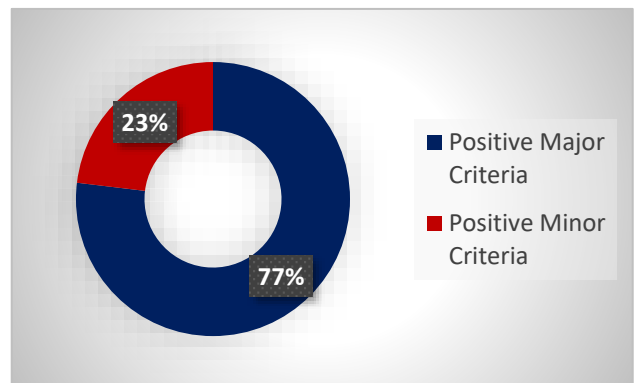
**Figure 2: Percentage of children with positive mAPI.**

Figure 3 shows the gender-wise percentage of children with mAPI. Of the 13% of children with positive mAPI, 14% (n=8) were male and 12% (n=5) were female children.



**Figure 3: Gender-wise percentage of children with positive mAPI.**

Figure 4 shows the criteria wise distribution of the children with positive mAPI. Of the 13 children who had positive mAPI, majority of them 77% had positive major criteria and 23% of them had positive minor criteria.



**Figure 4: Criteria wise distribution of children with positive mAPI.**

## DISCUSSION

In our study we aimed to predict the prevalence of asthma in children less than 3 years of age. The use of the mAPI greatly increased the probability of predicting future asthma risk.<sup>2</sup> Reported benefits of the mAPI include ease of application in a clinical setting and the ability to rule out asthma.<sup>5</sup>

The mAPI overcomes some diagnostic drawbacks of the original API as well. The primary threshold in the API is “early frequent wheezing.” Wheezing frequency was determined by questionnaire (scaled 1 to 5, from “very rarely” to “on most days”), and a score of  $\geq 3$  was considered early frequent wheezing.<sup>2</sup>

In contrast, the mAPI asks the parent to recall the specific number of wheezing episodes. In addition, the API uses physician-diagnosed allergic rhinitis, which is often difficult to diagnosis and distinguish from infectious rhinitis in preschool-age children.<sup>2</sup>

Our study shows that 13% of these children who were included in the study have a high probability to develop asthma in their childhood and adult years. Benefits of the mAPI include ease of application in a clinical setting.

## CONCLUSION

A positive mAPI substantially increases probability of future asthma. mAPI's high predictive ability after a positive test can have clinical value for identifying children at risk of asthma. This study may help clinicians better to identify these at-risk children. These children can

be followed-up at regular intervals, monitored for development of asthma.

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*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

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