



# **Beliefs and Factors Affecting the Usage and Compliance of Inhalers in Treatment of Asthma in Children**

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## **Authors' contributions**

*This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.*

## **Article Information**

DOI: 10.9734/JPRI/2021/v33i48B33255

### Editor(s):

(1) Vasudevan Mani, Qassim University, Saudi Arabia.

### Reviewers:

(1) Michael L. Goris, Stanford University School of Medicine, USA.

(2) Bodena Bayisa Derse, Jimma University, Ethiopia.

(3) Mertha M Nyamande, University of Derby, UK.

Complete Peer review History: <https://www.sdiarticle4.com/review-history/75988>

**Original Research Article**

**Received 27 August 2021**

**Accepted 02 November 2021**

**Published 08 November 2021**

## **ABSTRACT**

**Background:** Despite the availability of several treatment modalities-various formulations of inhaled corticosteroids and delivery devices, the prevalence of asthma is increasing in the developing countries, especially among the paediatric age group. Though Inhaled corticosteroids are effective in the management of asthma, parents prefer oral medications and nebulisers as the treatment modality for their children. Thus, there is a general reluctance amongst the parents towards the use of inhalers. This article focuses on the beliefs and factors affecting the usage and compliance of inhalers in the treatment of asthma.

**Objectives:** To assess Beliefs and factors affecting the usage and compliance of inhalers in treatment of asthma in children.

**Materials and Methods:** This study was conducted in Tamilnadu from March 2021 to June 2021. A cross-sectional study was conducted among 112 asthma patients of paediatric age group in a tertiary care medical college and hospital in Chennai through a questionnaire containing the demographic details, details regarding the treatment modalities, the inhalers and their usage. The results obtained were tabulated and analyzed.

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**Result:** The study included 112 asthmatic patients, 68 boys and 44 girls of whom 87.17% of the children had recurrent episodes of cough and cold. 45.53% of the patients used oral medications along with nebulisation, 26.8% used inhalers and 27.67% used inhalers along with oral medications. 78.57% of the parents were aware about the use of inhalers in the treatment of asthma and 59.82% of the parents showed reluctance to use inhalers for their children.

**Conclusion:** In spite of inhaled corticosteroids being effective in the management of asthma, oral medications and nebulisers are the mainstay treatment in majority of the cases. Social stigma, fear of addiction and lack of knowledge are the major reasons for the reluctance of parents towards the use of inhalers.

*Keywords: Inhaled corticosteroids; pediatric; asthma.*

## 1. INTRODUCTION

Asthma is defined as reversible obstruction of the airways, characterized by hyperresponsiveness to a variety of stimuli, caused by chronic inflammation. The airway obstruction is reversible, and results in recurrent episodes of wheezing, cough, and shortness of breath that will resolve either spontaneously or with treatment.

Various genetic and environmental factors play a role in the development of asthma [1]. The airway obstruction can be triggered by viral infections, atypical bacteria like *Mycoplasma pneumoniae* infections, allergens and/or air pollutants, including tobacco smoke, medications, physical exercise, and stress and emotions [2].

Asthma is a leading cause of hospitalization in children and it is one of the most important chronic conditions causing absenteeism in elementary school [3,4]. Though the prevalence of asthma in India (5-15%) is low when compared to European countries (<20%), the disease is more severe and is undertreated in more than 40% of the cases [5,6,7,8]. Cases of severe asthmatics are more prevalent in rural than in urban areas. Lack of appropriate treatment facilities, ignorance and excessive health-care expenditures have all contributed to the poverty in chronic cases [5,8,9]. This presents a need for an integrated approach for the management of asthma in primary health centres [5].

In the pediatric age group, Inhalation therapy is the cornerstone of asthma treatment [10]. It has reduced the concern about the adverse effects induced by systemic CS in children [11]. Its mechanism of action involves down regulation of pro-inflammatory proteins [12,13]. It also induces reversal of the asthma-induced structural

changes (airway remodelling), including the increased vascularity of the bronchial wall [14].

The use of currently available medications for asthma, along with close medical follow-up, shows better prognosis in majority of patients. However, asthma continues to be a major health problem and there still remain a number of controversies around the optimal care of acute and chronic asthma in children.

Despite the availability of inhaled corticosteroids for the treatment of asthma, parents prefer other treatment modalities like oral medications and nebulisers. There is a general reluctance amongst parents towards the use of inhalers. This study focuses on the beliefs and factors affecting the compliance of inhalers in the treatment of asthma among the paediatric age group.

## 2. MATERIALS AND METHODS

### 2.1 Study Design

Cross sectional study.

### 2.2 Study Duration

The study was conducted for a period of 4 months starting from March 2021 to June 2021.

### 2.3 Study Place

The study was conducted in paediatric department of a tertiary care medical college and hospital in Chennai.

### 2.4 Sample Size

The appropriate sample size was calculated using the statistical formula based on confidence interval, margin of error and population proportion.

## 2.5 Study Population

### 2.5.1 Inclusion criteria

All patients attending the paediatric department diagnosed with asthma (diagnosis confirmed by their primary care provider) were included in the study.

### 2.5.2 Exclusion criteria

All patients with an additional respiratory disorder like pneumonia or other cardiac diseases were excluded from the study.

## 2.6 Procedure

Data was collected through a self-prepared questionnaire containing the demographic details, educational status, details regarding the treatment modalities, the inhalers and their usage. Detailed information on age, gender, current mode of treatment and reasons for the reluctance towards inhalers were collected.

All the data thus collected were entered into Microsoft excel 2017 and imported into SPSS version 23 for further analysis.

## 3. RESULTS

The study included 112 asthmatic patients, 68 boys and 44 girls who were on active treatment. 87.17% of the children had recurrent episodes of cough and cold.

Chart 1. Asthma patients of paediatric age group in a tertiary care

Age	Number of children
<1 YEAR	5
1-5 YEARS	51
5-10 YEARS	42
>10 YEARS	14

Oral medication along with nebulisation was the primary treatment in 51(45.53%) of the patients. Inhalers were used by only 30(26.8%) of the patients and about 31(27.67%) used inhalers along with oral medications, nebulisation and iv medications.

88(78.57%) of the parents were aware about the use of inhalers in the treatment of asthma but about 60(53.57%) preferred oral medications and nebulisation over inhalers.

About 67(59.82%) of the parents showed reluctance to use inhalers for the children. This reluctance of parents towards the use of Inhalers was attributed to several reasons. Amongst those who showed reluctance, 23(34.32%) had fear of addiction and side effects over long term use. 23(34.32%) of the parents were under the pressure of social stigma as their family members advised against its use. 17(25.36%) of the parents stated that they felt nebulisers were more effective and 4(6%) believed that inhalers were more expensive.

86(76.78%) of the parents preferred oral medication and nebulisers and only 26(23.22%) preferred inhalers as their treatment modality.

77(68.75%) of the patients lacked knowledge regarding the proper use of inhalers and 89(79.46%) stated that they didn't receive adequate training to use inhalers effectively.

Amongst the mothers, 23(20.53%) had finished their primary school, 52(46.42%) had a higher secondary education, 20(17.85%) were undergraduates and 17(15.17%) had a postgraduate degree.

## 4. DISCUSSION

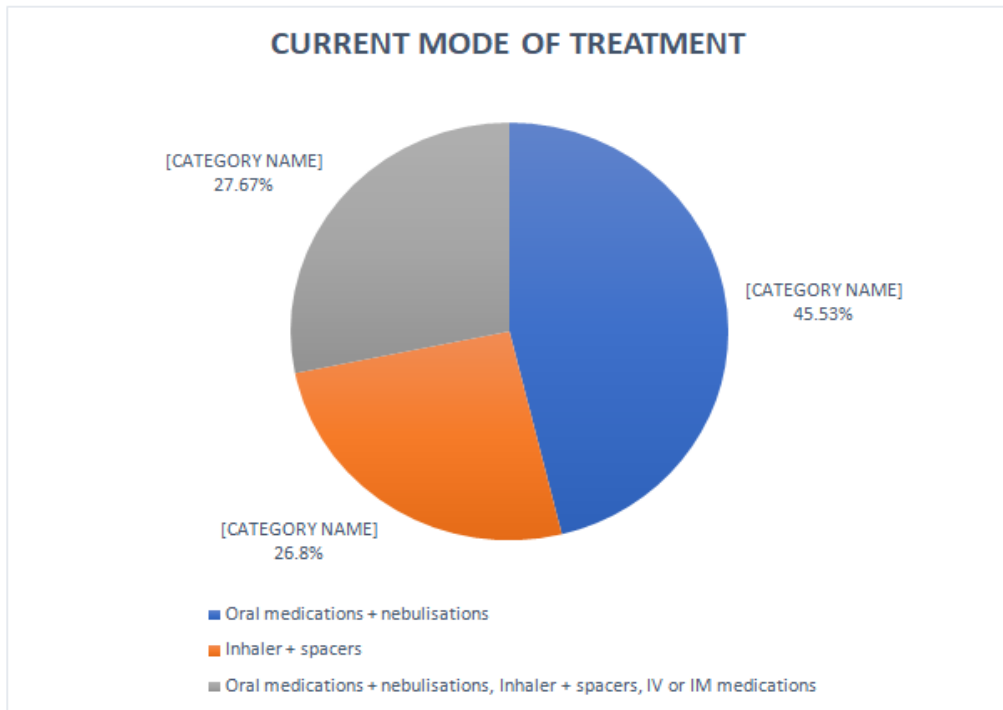
Acute asthma attacks are one of the most common reasons for paediatric hospital visits and unscheduled clinic appointments [15]. In our study, Oral medication and nebulisation was the mainstay treatment in about 53.57% of the patients. The use of nebulisation was effective in majority of cases and when coupled with oral medications form a standard treatment regime. The rate of acceptance to this treatment modality was higher as there was no complaints of reluctance from the parents as in the case of Inhalers.

About 59.82 % of the parents showed reluctance to use inhalers for their children in fear that it may lead to addiction over long term use, find it expensive and are worried about their side effects. There is also a stigma among the general public regarding the use of inhalers and family members advice against its use.

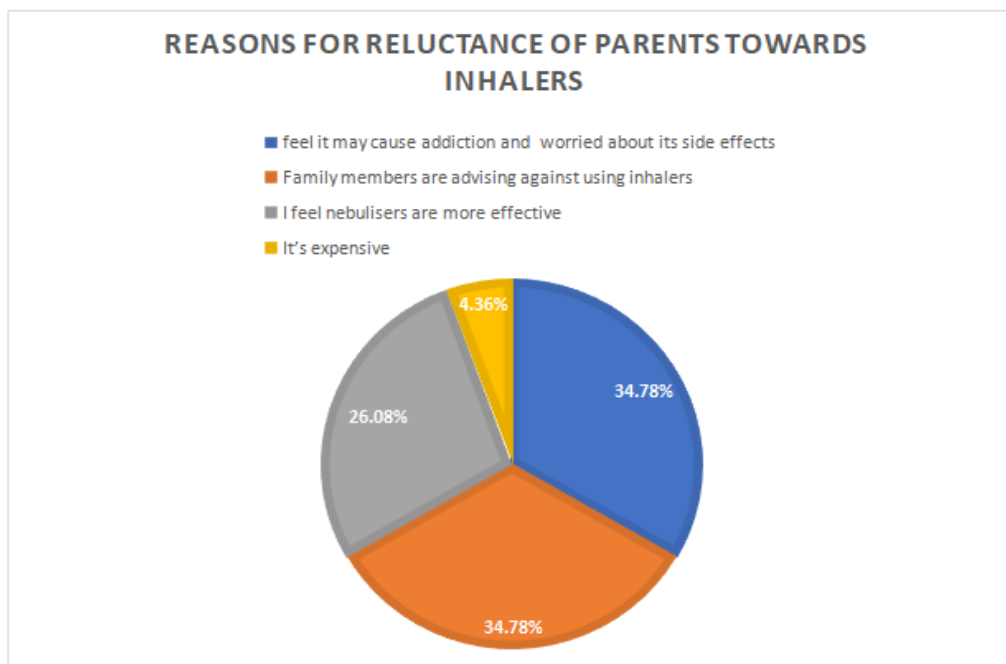
Asthma CPG do not recommend the use of nebulizers in mild or moderate asthma flareups; use of spacers is clinically more effective in terms of reduced stay in the ED and is more cost-effective. Although low dose inhaled

corticosteroids are effective in reducing the symptoms and morbidity in asthmatic children, previous studies in Australia and the United States revealed that only 20–40% of children who needed maintenance therapy were given

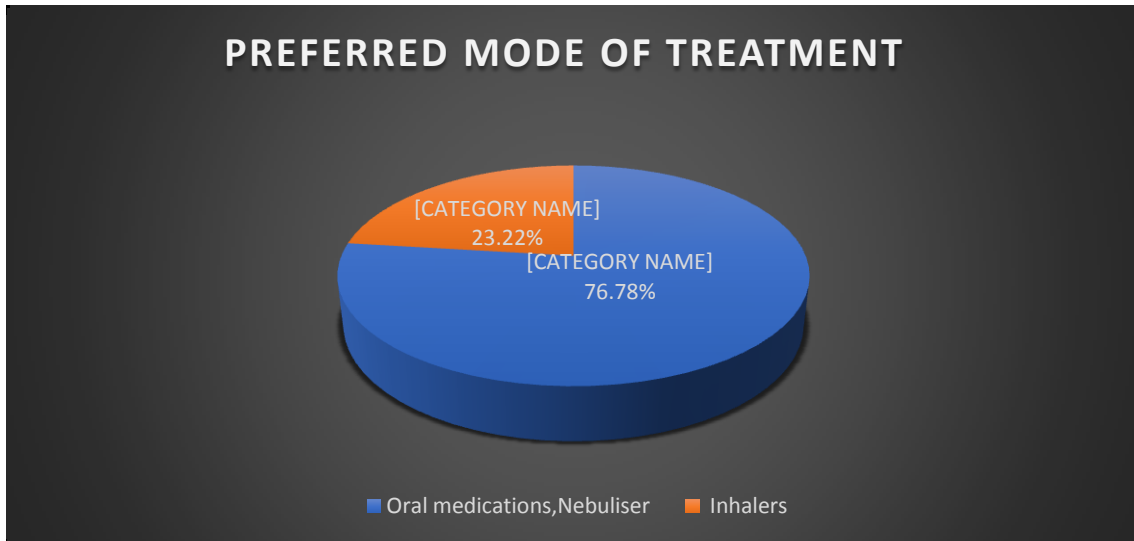
inhaled corticosteroids [16,17]. In our study, inhaled corticosteroids was recommended only to 26.8% of the children in spite of the inhalers being effective in controlling the symptoms in almost 86.9% .



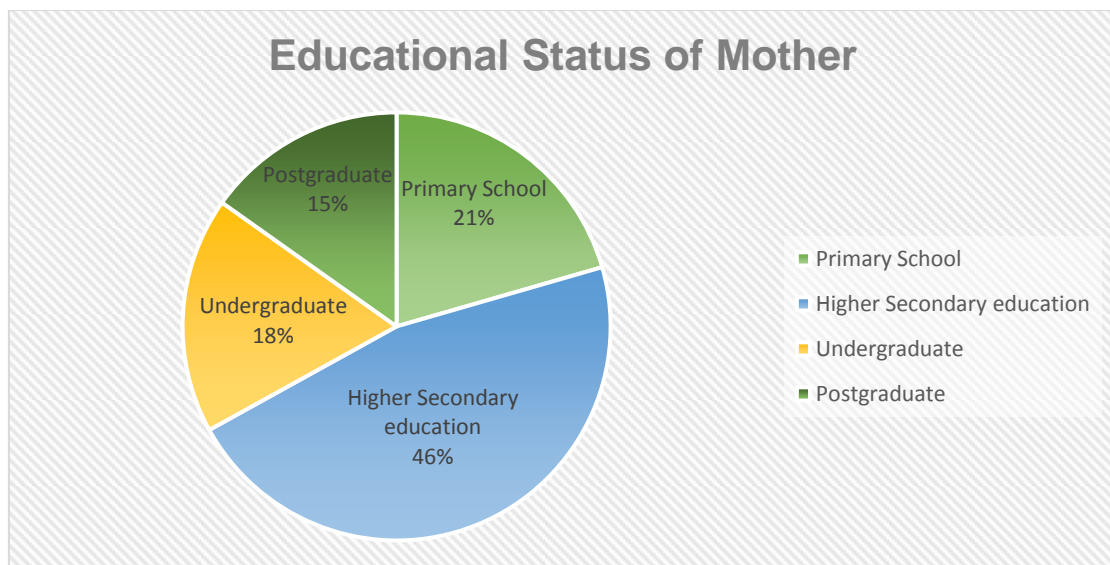
**Fig 1. Current mode of treatment**



**Fig. 2. Reasons for reluctance of parents towards inhalers**



**Fig. 3. Preferred mode of treatment**



**Fig. 4. Educational status of mother**

Our study showed that a major problem associated with inhalers is the lack of knowledge and training in its proper use. 69.23% of the patients lacked knowledge regarding the use of inhalers and 79.48% stated that they have not been taught the proper technique to use inhalers.

Several studies have showed similar results. A study conducted in Sydney Children’s Hospital revealed that less than 30% of children with persistent asthma received training on inhaler techniques or had their inhaler technique reassessed [18]. Another study conducted in Sweden reported that only 14% of children with asthma attending primary care received a

demonstration of inhalation techniques [19]. Thus, Greater emphasis has to be made to educate the children regarding the proper use of inhalers.

In order to improve asthma control among the paediatric age group, a personalized guidance for managing the symptoms, through a written action plan is essential [20]. Studies have shown that having a written asthma treatment plan can significantly reduce the number of ER visits due to asthma attacks [21].

The mother plays a vital role in the management of the asthma in her child and this requires the

mother to be educated and to have a proper understanding about the disease and the treatment modalities available. In our study, 21% of the mothers had attended primary school and 46% had finished their higher secondary education. There was a higher incidence of asthma in children whose mothers didn't pursue higher studies, especially among those who did not have an undergraduate education. Thus, for better prognosis, proper awareness and education about the disease, its management and the use of inhalers to both the parents and the children is necessary.

## 5. CONCLUSION

In spite of inhaled corticosteroids being effective in the management of asthma, oral medications and nebulisers are the mainstay treatment in majority of the cases. Social stigma, fear of addiction and lack of knowledge are the major reasons for the reluctance of parents towards the use of inhalers. Thus, proper awareness and education about inhalers and its use is essential for better prognosis and management of pediatric asthma.

## CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the author(s).

## ETHICAL APPROVAL

The approval of the Institutional ethics committee was obtained to conduct the study. Permission was also obtained from the Head of Paediatric department before starting the study.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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