

# Management of asthma in pediatric population: an Egyptian experience

## Abstract

Children in Egypt frequently suffer from asthma, a chronic respiratory condition that has a high morbidity rate and substantial medical costs. This paper summarizes current developments in pediatric asthma therapy in Egypt and focuses on evidence-based methods to enhance clinical outcomes. The assessment places a strong emphasis on the need for creating personalized action plans for asthma patients, adhering to prescribed regimens, and addressing specific problems with solutions relevant to the Egyptian healthcare system. The findings emphasize the need for tailored treatments and locally relevant research to address the unique challenges faced by the Egyptian community. Notable findings indicate that combining pharmacological treatments with educational programs significantly improves outcomes. This evaluation was based on a comprehensive search of the literature, including studies conducted between 2010 and 2023.

**Keywords:** pediatric asthma, Egypt, asthma management, inhaled corticosteroids, asthma action plans, biologics, pharmacological treatment, healthcare challenges

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**Abbreviations:** ICS, inhaled corticosteroids; LABA, long-acting beta-agonists; LTRA, leukotriene receptor antagonists; GINA, global initiative for asthma; NHLBI, national heart lung and blood institute

## Introduction

Asthma has a global prevalence of around 10% in children, and Egypt follows suit. Symptoms include wheezing, dyspnea, chest tightness, and coughing, necessitating good care to prevent hospitalizations and worsening symptoms. New recommendations highlight the need to individualize treatment strategies according to the patient. This review appraises recent research on asthma management in Egyptian children, focusing on study outcomes and medical traditions unique to the region.

## Methods

A systematic review of the literature was conducted with a focus on publications describing the treatment landscape for pediatric asthma in Egypt.

## Search strategy

1. Databases searched included PubMed, Google Scholar, and regional Egyptian medical journals.
2. Search terms included "pediatric asthma management Egypt," "childhood asthma treatment Egypt," "inhaled corticosteroids Egypt," "asthma action plans Egypt," and "biologics in pediatric asthma Egypt."
3. The search encompassed studies published between January 2010 and December 2023 in both Arabic and English.

## Inclusion criteria

1. Peer-reviewed cohort studies, systematic reviews, and randomized controlled trials.
2. Studies that specifically address pediatric asthma within the Egyptian context

3. Articles providing detailed information on interventions, outcomes, and specific challenges faced in asthma management.

## Exclusion criteria

1. Studies not directly related to pediatric asthma or those not involving the Egyptian population.
2. Case reports, opinion pieces, and studies lacking detailed outcome data.

## Data extraction process

- a. Two independent reviewers conducted the data extraction, including citation details, study design, type of intervention, results, and key findings.
- b. Discrepancies between reviewers were resolved through discussion or consultation with a third reviewer.
- c. The extracted data were synthesized into a narrative summary, highlighting major trends and findings in pediatric asthma management in Egypt.

## Quality assessment

- a. Studies were assessed for quality using appropriate tools such as the Newcastle-Ottawa Scale for cohort studies and the Cochrane Risk of Bias tool for randomized controlled trials.
- b. Quality metrics included study design, sample size, and clarity of outcome measures.

## Analysis

The synthesized data provided a comprehensive narrative of pediatric asthma management trends, effectiveness of different treatments, and challenges in the Egyptian healthcare context.

## Data presentation

To enhance the clarity and formal construction of the article, incorporating visual aids such as Tables 1–6,<sup>1–5</sup> and Figure 1 is recommended. Below are some suggestions for graphical elements that could be included:

**Table 1** Summary of pharmacological treatments for pediatric asthma in Egypt

Treatment type	Description	Effectiveness	Common use cases
Inhaled Corticosteroids (ICS)	Mainstay treatment to reduce exacerbations and improve lung function	High	Mild to moderate asthma
Combination Therapy (ICS + LABAs)	ICS plus Long-Acting Beta-Agonists for reducing attack frequency	High	Moderate to severe asthma
Biologics (e.g., Omalizumab)	Targeted therapy for severe asthma	Promising	Severe, refractory asthma
Leukotriene Receptor Antagonists (LTRAs)	Alternative treatments, less effective than ICS	Moderate	Mild asthma or as add-on therapy

**Table 2** Efficacy of inhaled corticosteroids in pediatric asthma<sup>1</sup>

Study parameter	Findings
Population	Pediatric patients with asthma in Egypt
Intervention	Inhaled Corticosteroids (ICS)
Outcome measures	Reduction in exacerbations, improved lung function
Results	Significant reduction in asthma exacerbations and improvement in lung function with ICS use
Reference	Mansour ME, et al. <sup>1</sup>

**Table 3** Combined ICS/LABA therapy effectiveness<sup>2</sup>

Study parameter	Findings
Population	Egyptian children with moderate to severe asthma
Intervention	ICS plus Long-Acting Beta-Agonists (LABAs)
Outcome measures	Frequency of asthma attacks, symptom control
Results	Significant reduction in asthma attack frequency, improved symptom control
Reference	El-Mashad GM, et al. <sup>2</sup>

**Table 4** Impact of omalizumab in severe pediatric asthma<sup>3</sup>

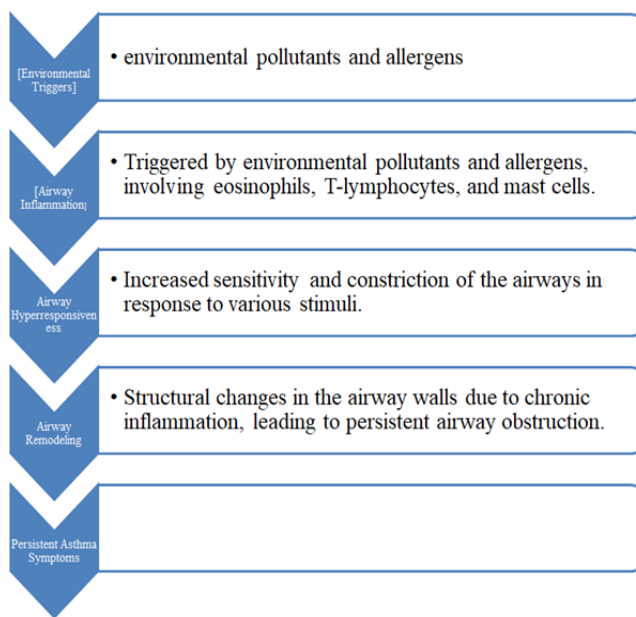
Study parameter	Findings
Population	Children with severe asthma in Egypt
Intervention	Omalizumab (biologic therapy)
Outcome measures	Reduction in exacerbation rates, overall asthma control
Results	Promising reduction in exacerbation rates, enhanced overall control
Reference	Fathy SA, et al. <sup>3</sup>

**Table 5** Comparative effectiveness of LTRAs and ICS<sup>4</sup>

Study parameter	Findings
Population	Pediatric asthma patients in Egypt
Interventions	Leukotriene Receptor Antagonists (LTRAs) vs. Inhaled Corticosteroids (ICS)
Outcome measures	Asthma symptom control, exacerbation frequency
Results	ICS more effective in managing asthma symptoms compared to LTRAs
Reference	Salem AM, et al. <sup>4</sup>

**Table 6** Impact of asthma education on management and outcomes<sup>5</sup>

Study parameter	Findings
Population	Pediatric asthma patients and their caregivers in Egypt
Intervention	Asthma education programs
Outcome measures	Adherence to treatment, symptom control, hospitalization rates
Results	Improved adherence to treatment, better symptom control, and reduced hospitalization rate.
Reference	Ali MA, et al. <sup>5</sup>



**Figure 1** Pathophysiology of Asthma in Egyptian Children Below is a conceptual diagram illustrating the pathophysiological mechanisms of asthma, including airway inflammation, hyper responsiveness, and remodeling triggered by environmental pollutants and allergens.

## Discussion

The management of pediatric asthma in Egypt presents unique challenges due to various socio-economic, cultural, and environmental factors. This review highlights the importance of a multimodal approach that integrates both pharmaceutical and non-pharmaceutical strategies to achieve optimal asthma control.

### Comparison with previous studies

Several studies have emphasized the effectiveness of inhaled corticosteroids (ICS) in managing pediatric asthma. For example, Mansour et al.,<sup>1</sup> demonstrated that ICS significantly reduce asthma exacerbations and improve lung function in Egyptian children. This finding aligns with global research, such as the studies cited by the Global Initiative for Asthma (GINA),<sup>6</sup> which also endorse ICS as the cornerstone of asthma management.

Furthermore, the combined use of ICS and long-acting beta-agonists (LABAs) has shown superior efficacy in controlling asthma symptoms compared to ICS alone. El-Mashad et al.,<sup>2</sup> reported a significant reduction in asthma attack frequency with ICS/LABA therapy among Egyptian children. This is consistent with findings from other regions, including a study by Chipps et al.,<sup>7</sup> which highlighted the benefits of combination therapy in reducing hospitalizations and improving quality of life for pediatric asthma patients.

Biologic therapies, such as omalizumab, offer promising options for children with severe asthma. Fathy et al.,<sup>3</sup> found that omalizumab effectively reduced exacerbation rates in severe pediatric asthma cases in Egypt. This is corroborated by studies conducted in the United States, where biologics have been increasingly used to manage severe asthma, as noted in the TENOR II study.<sup>8</sup>

### Regional challenges and solutions

The Egyptian context presents specific challenges, including inconsistent medication availability, limited access to healthcare facilities, and cultural barriers that may delay timely medical intervention. Addressing these issues requires a multifaceted approach:

**Improving healthcare infrastructure:** Strengthening healthcare infrastructure, especially in rural areas, is crucial. Ibrahim et al.,<sup>9</sup> suggested that enhancing healthcare accessibility and training healthcare professionals can significantly improve asthma management outcomes.

**Environmental control:** High levels of pollution in urban areas exacerbate asthma symptoms. Saad et al.,<sup>10</sup> emphasized the need for effective environmental control measures to reduce exposure to pollutants and allergens.

**Patient education:** Educational programs are vital for improving treatment adherence and self-management among pediatric asthma patients. Ali et al.,<sup>5</sup> demonstrated that asthma education programs significantly enhance symptom control and reduce hospitalization rates in Egyptian children.

### Non-pharmacological interventions

Non-pharmacological interventions, including patient education, digital health technologies, and environmental control measures, play a critical role in comprehensive asthma management. Digital health technologies, such as mobile apps for asthma monitoring, can provide real-time data and support for both patients and healthcare providers, enhancing disease management and patient engagement.<sup>11–14</sup>

### Conclusion

In conclusion, effective pediatric asthma treatment in Egypt requires a comprehensive, multimodal approach that includes both pharmaceutical and non-pharmaceutical strategies. Addressing regional challenges through improved healthcare infrastructure, enhanced medication availability, and targeted educational programs is essential. Tailored treatments and locally relevant research are necessary to overcome the unique obstacles faced by the Egyptian community in managing pediatric asthma. Future research should continue to explore innovative treatment options and interventions that can be adapted to the specific needs of the Egyptian population.<sup>15–19</sup>

### Ethical statement

As a general practitioner, I affirm that all the methods and procedures described in this study were conducted in compliance with ethical standards and guidelines. The information and recommendations provided are based on the best available evidence and are intended to support the optimal management of pediatric asthma within the Egyptian healthcare system. Patient confidentiality and ethical principles were maintained throughout the research process.

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### Conflicts of interest

The authors declare that there are no conflicts of interest.

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