



**INTERNATIONAL JOURNAL OF
PHARMACEUTICAL SCIENCES**
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: <https://www.ijpsjournal.com>



Review Paper

Promoting Patient Adherence to Inhaler Therapy in Asthma Management: A Review

Nizi Alexander*, Chintha Chandran, Shaiju S Dharan, Dhanya Dharman

Department of Pharmacy Practice, Ezhuthachan College of Pharmaceutical Sciences, Marayamuttom, Thiruvananthapuram

ARTICLE INFO

Published: 23 Jan. 2025

Keywords:

Adherence on ICS inhalers,
Non adherence,
Interventions, Treatment
outcomes

DOI:

10.5281/zenodo.14722876

ABSTRACT

Asthma, a chronic respiratory dysfunction characterized by airway inflammation, bronchial hyper responsiveness and reversible airflow obstruction affecting millions worldwide, necessitates effective management strategies to control symptoms and prevent exacerbations. GINA Global Strategy Report was updated on 2023 with new guidelines for managing asthma. Globally, asthma prevalence has been steadily increasing, particularly in urban areas, with an estimated 300 million affected individuals. Epidemiological studies in India have revealed a higher prevalence of asthma, with an estimated 15-20 million affected individuals. Asthma is a complex condition with diverse clinical presentations and treatment considerations. Diagnosis of asthma involves a combination of clinical assessment, including medical history, physical examination and lung function tests. Spirometry, which measures airflow obstruction and reversibility, is a key diagnostic tool. Treatment strategies include Inhaled corticosteroids, long acting beta agonists, leukotriene modifiers, short acting beta agonists. Inhaler therapy stands as a cornerstone in the management of asthma, yet suboptimal patient adherence poses a significant challenge to achieving treatment goals. This review examines the multifaceted factors influencing patient adherence to inhaler therapy in asthma management. Hereby, explores the impact of patient education, device usability, communication of health care provider, socioeconomic status and cultural beliefs on adherence levels. Additionally various levels of interventions like treatment level, clinician level and patient level are evaluated for their efficacy in enhancing adherence. Understanding these factors are crucial for optimizing asthma outcomes.

INTRODUCTION

Asthma, is a complex inflammatory disease that affects the respiratory airways. It is characterized

*Corresponding Author: Nizi Alexander

Address: Department of Pharmacy Practice, Ezhuthachan College of Pharmaceutical Sciences, Marayamuttom, Thiruvananthapuram.

Email ✉: nizialexander2000@gmail.com

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



by recurrent episodes of wheezing, chest tightness, breathlessness and coughing[1,2]. The Global Initiative for Asthma (GINA) provides guidelines for the prevention and management of asthma[45]. GINA classifies asthma severity into various categories based on several factors like symptoms, frequency of exacerbations and lung functions. This categories includes intermittent asthma, mild persistent asthma, moderate persistent asthma and severe persistent asthma[6,7]. Asthma is mainly characterized by several pathological features in the airways including chronic inflammation of airways which involves the infiltration of various immune cells including eosinophils, airway hyper responsiveness resulting in exaggerated bronchoconstriction and airflow limitation[8,12]. Excessive production and accumulation of mucus in the bronchial airways, repeated episodes of bronchoconstriction in asthma can lead to structural changes in the airway walls[10,11]. Asthma mainly occurs due to genetic predisposition, several allergens like pollen, dust particles, mold spores, mites, certain foods and also certain food particles triggers[20,22]. Environmental factors like air pollution, tobacco smoking, chemical fumes and other irritants can trigger asthma symptoms. Certain respiratory infections including viral infections can lead to inflammation and bronchoconstriction[18,24]. The airway inflammation occurring was mostly due to the immune response of various cells such as mast cells, T- Lymphocytes, eosinophils[25,27]. In response to that there will be mucus hypersecretion, inflammation and structural changes to airways[28,29]. Predisposing factors increases the risk of future development of asthma[18,19]. Genetic factors, lifestyle factors including stress, occupational exposure, excessive use of NSAIDs and various environmental factors including exposure to tobacco smoke can increase the risk of having asthma[20,23]. The diagnosis and management was mainly based on the

intensity and severity of the condition that was understandable from the spirometry test. The standard and updated version of treatment guidelines was mainly provided by GINA. Among various management strategies the inhaled corticosteroids has a core responsibility in asthma management. But the adherence of patients towards it makes the treatment outcome[3,4]. Daily ICS therapy is recommended as the first line controller therapy for persistent asthma management by the national and international guidelines[5,7]. Good adherence to ICS therapy is associated with lower risk of severe asthma exacerbations, it will be more cost effective and improve the outcome.

Prevalence Of Asthma

According to WHO, asthma affected an estimated 262 million people in 2019(1) and caused 455000 deaths. The prevalence of asthma in India was recently estimated as 3% population (30 million patients), with a prevalence of 2.4% in adults aged greater than 15 years, and between 4% and 20% in children. The prevalence of asthma was 1.8% among men and 1.9% among woman[17]. Geographical variations and rural-urban differences in prevalence can be observed. Rural rates (2.0%) were higher than urban rates (1.6%). The highest prevalence was observed among women in the rural north-eastern region (2.8%) and lowest prevalence was observed among men in the central and southern regions (0.9%). In self reported cases of asthma, the triggering factors that are responsible for aggravating asthma symptoms include tobacco smoke (83%), dust (83%) and strong smell (53%).

DIAGNOSIS

Asthma was mainly diagnosed by assessing the lung function test by spirometry or peak expiratory flow. This will provide the severity of obstruction. Spirometry helps to find out the forced vital



capacity (FVC) and FEV1 and thereby can understand the ratio of FEV1/FVC[32,25]. Spirometry is a diagnostic procedure assessing lung function by measuring the volume and speed of exhaled air. During the test, individuals inhale deeply and exhale forcefully into a spirometer, with the use option of using a bronchodilator to aid in opening airways. Bronchochallenging test also known as bronchoprovocation test was usually used to identify bronchial hyperresponsiveness and occupational asthma. Bronchoprovocation tests gauge airway reactions to specific substances.

Peak expiratory flow (PEF) tests measure maximum exhalation speed. Fractional exhaled nitric oxide (FeNO) tests analyze inflammation levels in the lungs by measuring nitric oxide concentration in exhaled breath. This procedure is low risk and suitable for adults and children over five years old[23].

MANAGEMENT

For rapid relief of acute symptoms, inhaled short acting beta 2 agonists are used. But, standard care for persistent asthma include daily maintenance therapy with inhaled corticosteroids. In patients to whom the ICS therapy was ineffective and insufficient, combination therapy of ICS and LABA are usually recommended[36,43]. Other controller approaches to asthma management includes long acting muscarinic antagonists and biological agents directed against proteins.

Medications for asthma management can be categorized into quick relief medicines, which alleviate symptoms during asthma attacks, and long term control medicines, aimed at preventing attacks and maintaining symptom control[32].

Quick relief medications include inhaled short acting beta2 agonists (SABAs), oral corticosteroids and short acting anticholinergics. These medicines work to quickly open the airways during an attack. Long term control medications

encompass corticosteroids, which reduce inflammation, biologic medicines like benralizumab for difficult to control asthma, leukotriene modifiers, inhaled mast cell stabilizers and inhaled long acting bronchodilators. Additionally, allergy shots, known as subcutaneous immunotherapy (SCIT), can help reduce the body's response to allergens[28,30]

Promoting Adherence To Ics Therapy In Patients With Asthma

Medication adherence is the term usually refers to which the patient's behavior that corresponds to the recommendations from health care provider. In asthma management, poor adherence to ICS is known to be the major cause for therapeutic failure[30,32]. Good adherence is associated with lower risk of severe asthma exacerbations and also the treatment become cost effective and the therapeutic outcome obtaining will be greater. Non adherence affects the quality of life of patient[40,42]. Adherence to ICS are disproportionately lower in patients with low socioeconomic status and ethnic minority. Non adherence and inappropriate inhaler technique will increase the risk of asthma exacerbation and poor asthma control and thus there will be increased burden for person and society, since there need emergency department utilization and hospitalization[20,23]. Not only that, in case of hospitalization of non adherent patients who experiencing severe symptoms, the physician step up the treatment regimen believing that more aggressive management was necessary to achieve control[25,27].

Factors Associated With Non Adherence

Mainly three factors are related to the non adherence of patients to ICS and include:

- Treatment related factors
- Clinician related factors
- Patient related factors

Treatment Related Factors



The major factor related to treatment includes the complexity of regimen. The more complex the treatment regimen lesser will be the adherence to medication and therapy since, the patient with low literacy status will not understand it properly and it can be tell as the major hurdle[29,32].

Then comes the cost of the treatment. As a result of high cost in the diagnosis and management of asthma, the patients who are low in socioeconomic status will not continue the treatment regimen. And without follow ups the therapy outcomes are not reachable. Not only that, the patients will not properly follow the frequency mentioned by the clinician to achieve appropriate outcome and they intentionally skip the ICS doses to reduce economic burden and to last the medication for few more days[33,35]. If patients experience a reduction in the existing symptoms, they will reduce the frequency of having inhaler. Some may also forget to refill the prescription correctly. Prior negative experience from the same treatment will increase the chance of being non adherent[42,43].

Clinician Related Factors

The important among clinician related factors include the communication skills. It is necessary for the rapport with patients. Proper communication with physician improves the patient comfort and acceptance towards him. Appropriate communication is necessary to discuss various health related topics and doubts. Clinician should pay proper attention to patients and never neglect their complaints[44,45]. Adherence to therapeutic regimens (especially in case of ICS therapy) requires proper education and training for patients. Providing education to patients, their family members and society about basic health care techniques are the responsibility of all clinicians. While educating the patients about the therapeutic regimen the clinician should consider the limitations and strength of individual patient[46,48]. The clinician should spend proper time for individual patient for their sake of

understanding the disease condition. Increase in the number of appointments per day is an important challenging factor in this. Next came the assessment of inhaler technique, the most iconic factor in the nonadherence of ICS therapy. Since, patients with poor inhalation technique suffer from recurrent episodes of asthma attack. So, prior demonstration of inhaler technique must be provided from the side of health care professional. Regular review and follow ups is necessary to understand the treatment outcome[48,50].

Patient Related Factors

Patients with low socioeconomic status and literacy levels are at highest risk of having non compliance to the ICS therapy for asthma management. Negative beliefs about the medication was more among them as they lack proper health related knowledge. Risk of nonadherence increases with increasing age of the patient. As the forgetfulness was mostly among the geriatric population due to their various diseases. Patient and their family characteristics as well as psychological distress can affect the adherence of patient towards ICS therapy[24,27].

Interventions To Improve Medication Adherence And Asthma Outcomes

Mainly three levels of interventions are introduced to improve the patient compliance towards the ICS therapy and includes;

- Treatment level interventions
- Clinician level interventions
- Patient level interventions

Treatment Level Interventions

Provide thorough education and training on how to use the inhaler and simplify the therapeutic regimen as complexity can increase the confusion of patients. Schedule regular follow up appointments to monitor the patient compliance to the inhaler therapy in asthma management as it was the mainstay in reducing symptoms

Implement certain reminder system like alarms. Assess the inhaler technique of the patient during



hospital visits and provide information if needed[45,47].

Clinician Level Interventions

Patient counseling and educational training about the inhaler use and other therapeutic interventions are necessary for achieving proper outcome of asthma management. Providing multidimensional asthma management education reduces the emergency department visits and hospitalization. Proper inhaler technique must be given to the patient initially and it was the responsibility of clinician. Also remember to give any visual aids like pictures or anything else to patients for remembering the frequency of drug regimen, supplementary to verbal orders. A clinical pharmacist can measure the adherence of patients by requesting them to demonstrate their inhaler using technique[48,49].

Patient Level Interventions

Physician or clinical pharmacist should focus the patients especially those who have reduced health literacy and poor socioeconomic status. And should provide individually tailored asthma education programme. Dose counters must be helpful in geriatric patients and those with forgetfulness. Reduction in cost to patients who are found as adherent to ICS therapy while refilling the prescription will be more helpful especially to those who has reduced socioeconomic status. Improved asthma knowledge and adherence to ICS therapy are associated with lower risk of severe asthma exacerbations[36,38].

CONCLUSION

In general, understanding inhaler adherence is crucial for effective asthma management. By recognizing the barriers as well as factors associated with non adherence and implementing tailored interventions, health care providers can significantly improve patient's outcome and thereby quality of life by reducing hospitalization

due to exacerbation of symptoms. Emphasizing education, support and personalized strategies can ultimately enhance compliance rates and optimize asthma control.

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HOW TO CITE: Nizi Alexander, Chintha Chandran, Shaiju S Dharan, Dhanya Dharman, Promoting Patient Adherence to Inhaler Therapy in Asthma Management: A Review, *Int. J. of Pharm. Sci.*, 2025, Vol 3, Issue 1, 1948-1955. <https://doi.org/10.5281/zenodo.14722876>

