



## STUDY OF ASSESSING THE ADEQUACY OF INHALER TECHNIQUE IN PATIENTS WITH ASTHMA AND CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN A TERTIARY CARE CENTER

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**ABSTRACT** **INTRODUCTION:** Asthma and chronic obstructive pulmonary disease (COPD) are ongoing concerns in health care. Poor inhaler technique leads to reduced drug delivery to the lungs and hence improper control of the symptoms.  
**AIM:** To assess the inhaler technique in patients with asthma and COPD  
**METHODS:** Patients on inhalation therapy for asthma and COPD attending Respiratory Medicine department in ASRAM medical college and hospital were included in the study. Their inhaler technique was assessed according to a standard check list.  
**RESULTS:** There were 108 participants, 86 with COPD and 22 with asthma in the study. Over half of the patients had incorrect inhaler technique. 52% of patients using rotahaler had good inhaler technique compared to 42% using pressurized metered dose inhaler (pMDI) with spacer and 35% using pMDI alone.  
**DISCUSSION:** Along with appropriate therapy, correct inhaler technique is the cornerstone of achieving good symptom control and prevention of exacerbations. Rechecking inhaler therapy time to time is very essential.

**KEYWORDS :** Asthma, chronic obstructive lung disease, rotahaler, pressurised metered dose inhaler (pMDI), spacer

### INTRODUCTION:

Asthma is a heterogeneous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough that vary over time and in intensity, together with variable expiratory airflow limitation. It is a common respiratory disease affecting 1-18% of the population in different countries<sup>1</sup>.

COPD is a common, preventable and treatable disease that is characterized by persistent respiratory symptoms and airflow limitation that is due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases. COPD is a leading cause of morbidity and mortality worldwide<sup>2</sup>.

Delivery of respiratory medications by inhalation that is inhalation therapy is the main stay of treatment in asthma and COPD. It achieves a high concentration in the airway, more rapid onset of action and fewer systemic adverse effects than systemic delivery. Inhalational therapy requires skill that should be learnt and maintained in order for the medication to be delivered effectively. Poor inhaler techniques lead to poor control of symptoms and increased risk of exacerbations. Most of the patients use inhalers inaccurately. It is very essential to check inhaler technique at every possible occasion and at every hospital visit to correct the inhaler technique.

As optimal drug delivery is essential in the management of respiratory

diseases, it is important to assess the patient's inhaler technique before initiating or changing a drug regimen.

### AIM:

To assess the inhaler technique in patients with asthma and COPD.

### Inclusion criteria:

1. Asthma and COPD patients with age above 18 years were included in the study.
2. Patients using either pMDI, pMDI with spacer or rotahaler were taken in to the study.

### EXCLUSION CRITERIA:

1. Those patients who could not self administer their medication.
2. Patients using other inhalational devices other than pMDI, pMDI with spacer and rotahaler.
3. Patients in exacerbation of asthma or COPD.

### METHODOLOGY:

A standard checklist was developed that covered the key points in using the inhaler technique. This checklist was adapted from European respiratory society skill workshop inhaler techniques<sup>3</sup>. Patients on inhalation therapy for asthma and COPD attending Respiratory Medicine department in ASRAM medical college and hospital were taken in to the study.

pMDI	pMDI with spacer	Rotahaler
1.* Shake four or five times.	1.* Shake four or five times	1. *Hold the rotahaler upright
2.Take the cap off	2. Take the cap off.	2.insert a rotacap in the hole given
3.Exhale slowly, as far as comfortable	3. Insert the mouthpiece of the pMDI into the open end of the spacer, ensure a tight fit.	3.*Rotate the lower parts of rotahaler till a click sound is heard
4.Hold the inhaler in an upright position	4. Place the mouthpiece of the spacer in the mouth with the teeth over the mouthpiece and the lips sealed around it.	4. Do not point the mouthpiece downwards once a dose has been prepared for inhalation because the dose could fall out.
5. Immediately place the inhaler in the mouth between the teeth, with the tongue flat under the mouthpiece. Ensure that the lips have formed a good seal with mouthpiece	5.exhale slowly, as far as comfortable	5. Exhale slowly, as far as comfortable (to empty the lungs). Do not exhale into the DPI.
6.*Start to inhale slowly, through the mouth and at the same time press the canister to actuate a dose	6.*Actuate one dose into the chamber of the spacer and start to inhale slowly through the mouthpiece.	6. Place the mouthpiece between lips and teeth to seal the mouthpiece.
7. *Maintain a slow and deep inhalation, through the mouth, until the lungs are full of air. This should take an adult 4-5 s.	7.* Maintain a slow and deep inhalation through the mouth, until the lungs are full of air.	7.* Start to inhale forcefully through the mouth from the very beginning. Do not gradually build up the speed of inhalation

8. At the end of the inhalation, take the inhaler out of the mouth and close the lips	8. At the end of the inhalation, take the inhaler out of the mouth and close the lips.	8. At the end of the inhalation take the inhaler out of the mouth and close the lips.
9. Continue to hold the breath for as long as possible, or up to 10 s before breathing out.	9. Continue to hold the breath for as long as possible for up to 10 s before breathing out.	9. Continue to hold the breath for as long as possible, or up to 10 s.

One point was assigned to each correct step with a total score of 9. Three steps for each inhaler were considered essential. Good technique was defined as achieving a minimum score of 6 including the three essential steps.

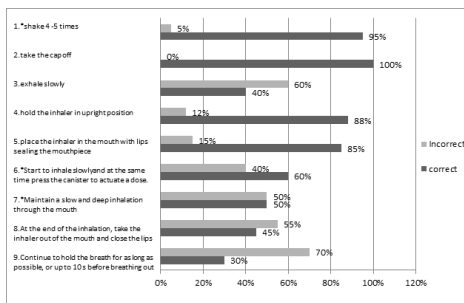
**RESULTS:**

Out of 108 participants 86 were COPD and 22 were asthma. Patients with COPD were older with a mean age of 64 compared to that of 34.7 in asthma group. 62.7% were male and 37.2% were female in COPD group. 54.5% were female and 45.5% were male in asthma group.

CHARACTERISTICS	ASTHMA	COPD
participants	22	86
mean age	34.7	64
male	45.50%	62.70%
female	54.50%	37.20%
pMDI	45.45%	17.40%
pMDI with spacer	22.70%	48.80%
DPI	31.80%	33.70%

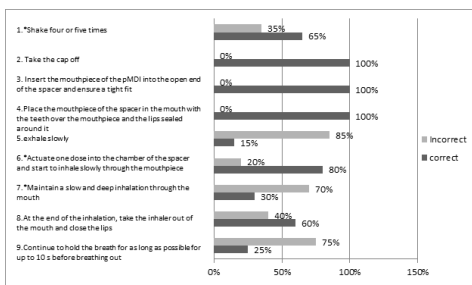
pMDI alone was used by 45.45% of asthma patients and 17.40% of COPD patients. pMDI with spacer was used by 22.70% of asthma patients and 48.80% of COPD patients. Rotahaler was used by 31.80% of asthma patients and 33.70% of COPD patients.

**Figure 1 : pMDI technique checklist assessment**



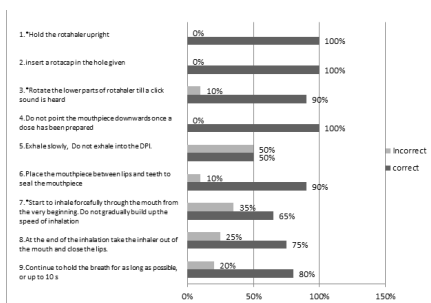
\*essential steps

**Figure 2: pMDI with spacer checklist assessment**



\* essential steps

**Figure 3: DPI checklist assessment**



\*Essential steps

35% of patients using pMDI alone, 42% using pMDI with spacer and 52 % using rotahaler had good inhaler technique.

84% of patients using pMDI with spacer are above 60 years of age.

**DISCUSSION:**

In this study we found that most of the patients had poor inhaler technique which is similar to other studies<sup>4,5</sup>. Patients using pMDI alone had poor inhaler technique compared to those using pMDI with spacer and rotahaler. Most of the patients using DPI-rotahaler had good inhaler technique.

Most common errors are not shaking the inhaler before use, not breathing out before inhaling, incorrect positioning of inhaler device, incorrect coordination of pMDI actuation with inspiration, delay in inhaling through a spacer device, improper inspiratory flow rate, breathing in either too fast or too slow, failure to hold breath after inhalation and multiple actuations at a time. These errors were comparable to other studies like CRITIKAL study<sup>(6,7)</sup>.

This study shows that most of the old age patients were using pMDI with spacer. Older patients had more difficulty in using pMDI alone compared to young patients<sup>(8,9,10)</sup>. There was no difference in errors between men and women.

**CONCLUSION:**

Educating the patients about correct inhaler technique is an integral component of asthma and COPD management. Good inhaler technique leads to better symptom control, decreases exacerbations and improves adherence to the therapy. Rechecking the inhaler technique at every visit is important to ensure that the correct technique is followed, as the patients may forget some steps in due course of time. It is also important to choose correct inhalation device. The choice of inhalation devices should take into consideration patients preference, age of the patient, actuation inhalation coordination and inspiratory flow rate.

**RECOMMENDATIONS:**

1. Chose the correct inhalation device appropriate for each patient.
2. Preferably every patient should be educated about the inhalation technique by the doctor before starting the treatment.
3. Inhaler technique should be rechecked at regular intervals.
4. Errors in the technique should be discussed and corrected.
5. Before escalating or changing the therapy, always check the inhaler technique and adherence to therapy.
6. Patients should be educated to rinse the mouth after inhalation to prevent side effects of inhalation therapy
7. Proper maintenance and handling of the device is also important to prevent cross infections.

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