

## Evaluation of Inhaler Technique among Patients with Obstructive Airway Diseases – An Observational Study

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### Original Research Article

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**Abstract:** Both asthma and COPD caused significant morbidity and mortality worldwide. Mainstay treatment for both the diseases includes inhalation therapy. But majority of the patients do not use inhalers properly resulting in poor control of the disease also requiring frequent hospital admission. This was an observational study done at Sri Ramachandra University, Porur, and Chennai with sample size of 100 patients. All these patients were already using inhalers (MDI, MDI with spacer and DPI) and their technique was assessed using standard questionnaire. Majority of the patients were in the age group of 50 to 70 years with 46% of them being male patients. 55% of the patients were diagnosed with COPD while 45% had asthma. 52% of the patients were using MDI, 36% were using MDI with Space while the remaining (12%) of the patients were using DPI. Out of 100 patients 98% of them using MDI without spacer, 89% using MDI with spacer and 94% of them using DPI had faulty technique. Patients who are using inhaler medications should have their inhaler techniques checked frequently to obtain proper control of their disease.

**Keywords:** Asthma, COPD, Inhaler techniques, MDI, DPI

### INTRODUCTION

Asthma and COPD (Chronic obstructive pulmonary disease) are the most common respiratory diseases. Asthma affects 1-18% of the people in different countries, while there are 384 million COPD cases reported in the year 2010 with a global prevalence of 11.7% [1,2].

Both asthma and COPD causing significant health care burden [3]. Inhalational therapy for asthma and COPD has been documented 4000 years back. In the year 1929 England, Camps evaluated use of epinephrine via inhalational route and described it as “spraying it into tracheobronchial tree”. Presently many drugs are delivered directly into the lungs. These include short acting beta 2 adrenergic receptors, long acting beta 2 adrenergic receptors, anti cholinergics, inhaled corticosteroids and mucolytics.

Inhaled medications have become the mainstay treatment for both asthma and COPD [4]. Improper use of inhaler medications causes decreased drug delivery into the tracheobronchial tree resulting in poor control of the disease. This leads to frequent exacerbations requiring hospital admissions. Hence appropriate training is essential for all the patients to ensure optimal therapy [5]. Many previous studies have reported inadequate inhalational technique varying from 77.5% to 89.2%. This depends upon the type of inhalers used, patients profile and the methods adopted [6].

### MATERIALS AND METHODS

This was an observational study done at Sri Ramachandra University, Porur, Chennai (with both in patients and out patients) between December 2016 to July 2017 in patients diagnosed with Asthma and COPD and who are using inhaler devices like dry powder inhaler (DPI), meter dose inhaler (MDI) and meter dose inhaler with spacer. Detailed history was recorded and the purpose was the study was explained to the patients. The written consent was obtained from all the participants.

#### Inclusion criteria

- Patients who are above the age of 18
- Patients who are diagnosed with Asthma or COPD
- Patients on regular use of inhaler medications
- Patients who are willing to participate in the study

#### Exclusion criteria

- Patients who are below 18 years of age
- Patients who are in exacerbation
- Patients who are not willing to participate in the study

- Patients who are not fluent in Tamil, English and Hindi

All the patients who participated in the study was subsequently assessed using a standard checklist [Table 1.1 – 1.3]

**Table 1.1 check list for patients using mdi (without spacer)**

- Take the cap of the inhaler mouthpiece
- Shake the inhaler
- Hold the inhaler upright
- Breathe out as much as possible, away from the mouthpiece
- Place the inhaler mouthpiece between the lips, keep the tongue from obstructing the mouthpiece
- Trigger the inhaler while breathing in slowly and deeply
- Continue to inhale until the lungs are full
- Remove inhaler from the mouth
- Hold breath for 5-10 seconds

**Table 1.2 check list for patients using mdi (with spacer)**

- Take cap off the inhaler mouthpiece
- Shake the inhaler
- Fit the inhaler into the opening at the end of the spacer
- Breathe out as much as possible, away from the mouthpiece
- Place mouthpiece between lips and teeth to seal the mouthpiece
- Trigger the inhaler while breathing in slowly and deeply
- Continue to inhale until the lungs are full
- Remove spacer from the mouth
- Hold breath for 5-10 seconds

**Table 1.3 check list for patients using dpi**

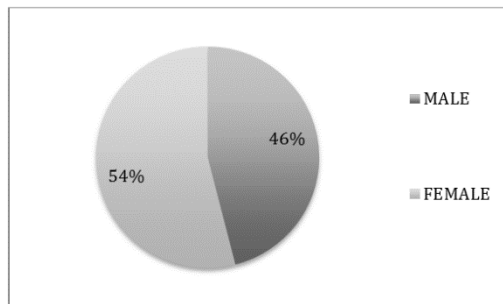
- Remove mouthpiece cover
- Sit upright or stand
- Exhale deeply, away from the mouthpiece
- Put mouthpiece between lips and close lips around
- Inhale deeply and forcefully
- Remove inhaler from the mouth
- Hold breath for 5-10 seconds

**RESULTS**

Total of 100 patients were included in the study

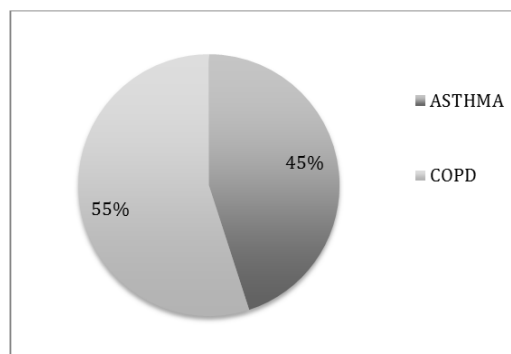
AGE Out of 100 patients, majority of the patients were between 51 – 70 years of age.

**Gender**



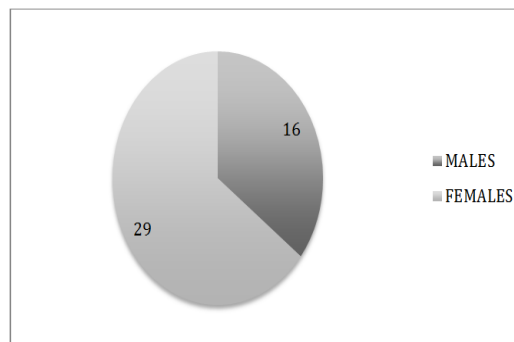
46% of the patients were males while 54% of the patients were females

**Disease distribution**



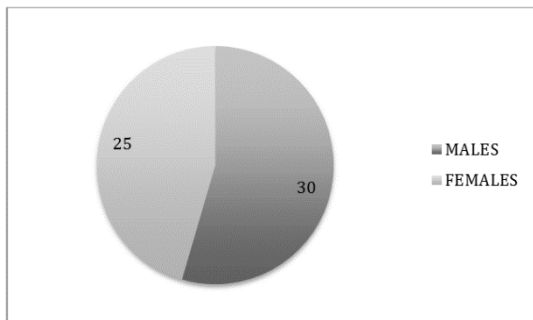
Out of 100 patients 45% of the patients were asthma while the remaining 55% of the patients were COPD

**Gender distribution in asthmatics**



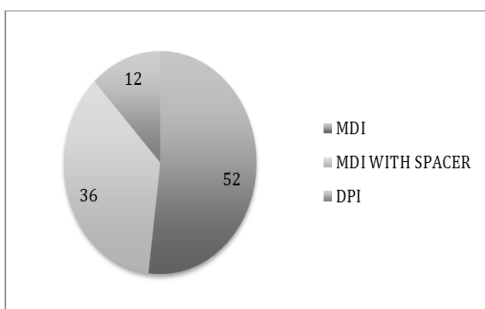
Out of 45 patients with asthma, 16 were males (36%) and 29 were females (64%)

**Gender distribution in copd**



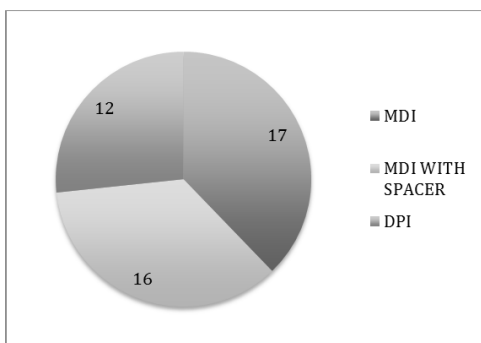
Out of 55 patients with COPD, 55% (30) of the patients were males and 45% (25) of the patients were females.

**Devices distribution**



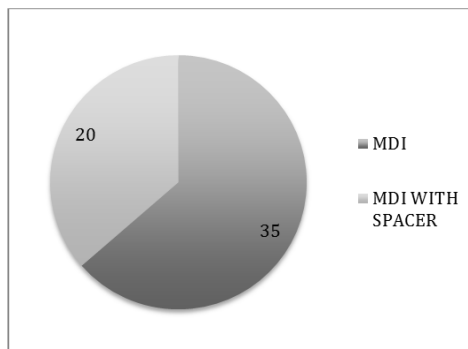
Out of 100 patients 52% were using MDI, 36% were using MDI with Spacer and 12% were using DPI

**Devices in asthmatics**



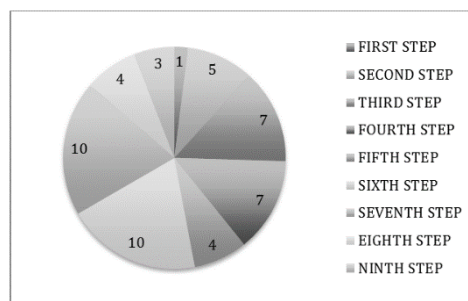
Out of 45 asthmatic patients, 38% (17) were using MDI, 36% (16) were using MDI with spacer and 26% (12) were using DPI

**Devices in copd**



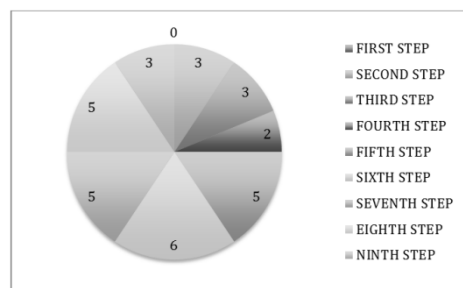
Out of 55 patients with COPD, 35 patients (64%) were using MDI while 20 patients (36%) had faulty technique

**Most common mistakes while taking mdi**



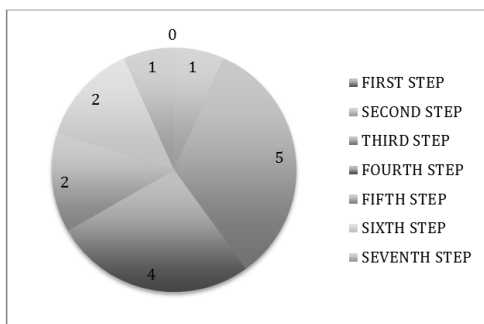
Out of 52 patients who were using MDI without spacer, 51 patients (98%) had faulty technique.

**Most common mistakes while taking mdi with spacer**



Out of 36 patients, 32 patients (89%) had faulty technique

**Most common mistakes while taking dpi**



Out of 16 patients, 15 patients (94%) made mistake in one step or another

## DISCUSSION

Improper use of inhalers is the Achilles heel in the management of obstructive airway diseases (asthma and COPD) [6]. Efficiency of inhaler medications depends upon how it is taken. Poor techniques result in improper control of the disease resulting in frequent hospital admissions. Correct use of inhaler medications also reduces the requirement for frequent usage of medications thus reducing its systemic side effects. Both MDI and DPI are simple devices but are not easy to use. Studies has stated that upto 90% of the patients do not use their inhalers properly. Along with poor control of the disease there is also severe economic consequences along with frequent use of antibiotics [7]. Upon asking most patients claim that their inhaler technique is good but when tested only one in ten patients will have correct technique [8]. There are number of factors associated with poor inhaler technique like age, physical disabilities, education of the patient, social circumstances, expectations about medications and mental illness [9]. Poor inhaler techniques are particularly seen in the elderly patients. This might be related to poor eyesight, reduced hand strength and manual dexterity. One in five elderly patients do not use their inhalers properly [10]. There are two common methods of patient education. One, to provide patients with printed materials or handouts containing pictures and texts. Second, is to show practical demonstration. Various studies have shown that practical demonstration has yielded better results compared to handouts [11].

## CONCLUSION

Assessment of inhaler technique in patients with obstructive airway diseases results in proper control of the disease. It also reduces the economic burden in these patients. Out of 100 patients who were enrolled in our study 98% of them using MDI without spacer, 89% using MDI with spacer and 94% of them using DPI had faulty technique

## Conflicts of interest

There are no conflicts of interest.

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