

## Knowledge regarding usage of inhaler technique in Asthma and COPD patients.

Jyothsna Guguloth<sup>1\*</sup>, Sabeela shaik<sup>2</sup>, Ramya Pinnamaneni<sup>3</sup> Rakesh Reddy<sup>4</sup>  
Neeharika Balla<sup>5</sup>

1\*Junior Resident, Department of Respiratory Medicine, ASRAMS, ELURU, ANDHRA PRADESH, INDIA

2. Junior Resident, Department of Respiratory Medicine, ASRAMS, ELURU, ANDHRA PRADESH, INDIA

3. Junior Resident, Department of Respiratory Medicine, ASRAMS, ELURU, ANDHRA PRADESH, INDIA

4. Junior Resident, Department of Respiratory Medicine, ASRAMS, ELURU, ANDHRA PRADESH, INDIA

5. Associate Professor, Department of Respiratory Medicine, ASRAMS, ELURU, ANDHRA PRADESH, INDIA

### ABSTRACT

#### BACKGROUND

**INTRODUCTION:** Inhaled drug delivery is the cornerstone of therapy for the treatment of obstructive chronic airway diseases, such as asthma and chronic obstructive pulmonary disease (COPD). The most common devices used to administer aerosolized medication in day-to-day respiratory practice are the pressurized metered-dose inhaler (pMDI) and the dry powder inhaler (DPI). Patient technique is crucial to effective drug delivery and will depend on factors such as patient experience, education, physical ability, and effective teaching of technique.

**AIM:** To evaluate the inhaler technique in Asthma and COPD patients.

**MATERIALS AND METHODS:** A cross-sectional study conducted at Asram medical college, a tertiary care teaching hospital, ELURU.

**RESULTS:** Out of 100 patients, only 58 patients were eligible to inclusion in the study. 21 of the 58 eligible patients declined to participate, so 37 patients were enrolled. 21 patients were diagnosed with COPD and 16 were diagnosed with asthma. 10 out of 37 patients (27 %) were considered good at performance. 5 patients (13.5%) were considered to perform moderately; the majority of patients (59.5 %) showed poor performance regarding correct inhaler technique. All patients with previous training (27% of study patients) demonstrated good knowledge regarding appropriate MDI technique. Overall 5 patients made critical errors while demonstrating inhaler technique. Patients using the MDI were more likely to make a critical error than patients using rotahalers.

**CONCLUSION:** The majority of patients in this study could not use their inhalers appropriately due to inadequate training. Educational intervention programs may contribute to the improvement of inhaler technique among patients.

**KEYWORDS:** DPIs, pMDIs, Inhaler Technique, COPD, ASTHMA.

Date of Submission: 14-01-2023

Date of Acceptance: 30-01-2023

### I. INTRODUCTION:

Globally, COPD caused more than 3 million deaths accounting for 6% of all deaths in 2019. Asthma affected an estimated 262 million people in 2019 and caused 4,55,000 deaths. Inhaled medication can control asthma symptoms and allow people with asthma to lead a normal, active life. Smoking, which is one of the most important risk factors for the development of respiratory diseases could be an explanation for the epidemic rise of COPD. Inhaled drug delivery is the cornerstone of therapy for the treatment of obstructive chronic airway diseases, such as asthma and chronic obstructive pulmonary disease (COPD). The most common devices used to administer aerosolized medication in day-to-day respiratory practice are the pressurized metered-dose inhaler (pMDI) and the dry powder inhaler (DPI). pMDIs are most often prescribed, but patients need to inhale correctly and coordinate breathing and actuation to ensure effective drug delivery. In contrast, DPIs are breath-actuated, with most devices relying on a rapid and powerful inhalation manoeuvre for drug delivery, which can be particularly problematic for patients who struggle to inhale forcefully. The effectiveness of inhaler devices depends on more than just the devices themselves. Patient technique is crucial to effective drug delivery and will depend on factors such as patient experience, education, physical ability, and effective teaching of technique. A systematic review of RCTs and observational studies supports the anecdotal impression and prejudice that pMDI devices are not used as effectively as dry powder inhalers. "The percentage of patients with correct

technique (assessed by a scoring system of correct steps) was 43% compared with 55% for pMDI with spacer and 59% for dry powder inhalers. However, teaching had a positive effect and eliminates significant differences between devices by increasing the percentage of patients with correct technique to 63% for pMDI and 65% for dry powder inhalers. Differences in effective patient technique therefore appear to owe more to the lack of teaching than to inherent differences in the devices themselves. All patients should receive appropriate instruction and guidance on effective technique when prescribed inhaler devices, and this should be regularly reinforced. Lack of adherence is a problem related to morbidity and mortality, complications, hospital stays, healthcare costs and dissatisfaction by the user and the professionals. Studies exist which prove that the COPD/asthma adherence rate is 33%.Improvement of patients' adherence to inhalation technique could lead to better outcome of treatment of asthma and COPD.

**AIM:** To evaluate the inhaler technique in Asthma and COPD patients.

## **II. MATERIALS AND METHODS:**

A cross-sectional study conducted from October 2021 August to July 2022 at Asram medical college ,a tertiary care teaching hospital.The medical profiles of out-patients from respiratory medicine reviewed to identify patients with prescriptions for inhaled medications.

### **Inclusion criteria:**

- 1) Age above 18 years
- 2) Diagnosis of asthma or COPD
- 3) Use of dry powder/meter dose inhaler therapy.

### **Exclusion criterion:**

- 1) No diagnosis of COPD , Asthma
  - 2) Had not used inhaler for at least 1 month
  - 3) Patient not available for enrolment
- Informed consent was taken from patients who met the screening criteria.

### **Recruitment of patients and demonstration of inhaler technique:**

Those patients are interviewed who consented to participate to obtain baseline characteristics. Patients are asked when and from whom they had most recently received counselling. Each patient has been asked to demonstrate technique through a placebo inhaler.Neither guidance was given nor feedback taken until the patient completes the demonstration of technique with all of the inhaler types he/she using.

### **Checklists for Assessing inhaler Technique:**

Based on recommendations for Checklists from previously published articles each of the inhaler technique had been checked .Checklist for each device consist of 9 steps.

#### Rotahaler Technique Checklist

1. Remove the cap from the inhaler\*
2. Keep inhaler upright\*
3. Rotate grip until a click is heard
4. Exhale to residual volume
5. Exhale away from mouthpiece
6. Place mouthpiece between teeth and lips
7. Inhale forcefully and deeply
8. Hold breath for 5 seconds
9. Exhale away from mouthpiece

#### Metered dose inhaler technique Checklist

1. Remove mouthpiece cover and shake\*
2. Hold inhaler upright\*
3. Exhale to residual volume
4. Keep head upright or slightly tilted
5. Place mouthpiece between teeth and lips
6. Inhale slowly and press canister
7. Continue slow and deep inhalation
8. Hold breath for 5 seconds
9. Close the inhaler

\*Critical step: if not performed correctly, little/no medication will reach the lung.

A scoring system was used in this study, each performed step given a value of 1 and an unperformed or incorrect step given a value of 0. Scores  $\geq 7$  with effective demonstration of critical steps considered as “good,” scores 5 and 6 with effective demonstration of critical steps considered “moderate,” and scores  $\leq 4$  and any failure to demonstrate critical steps were considered “poor.”

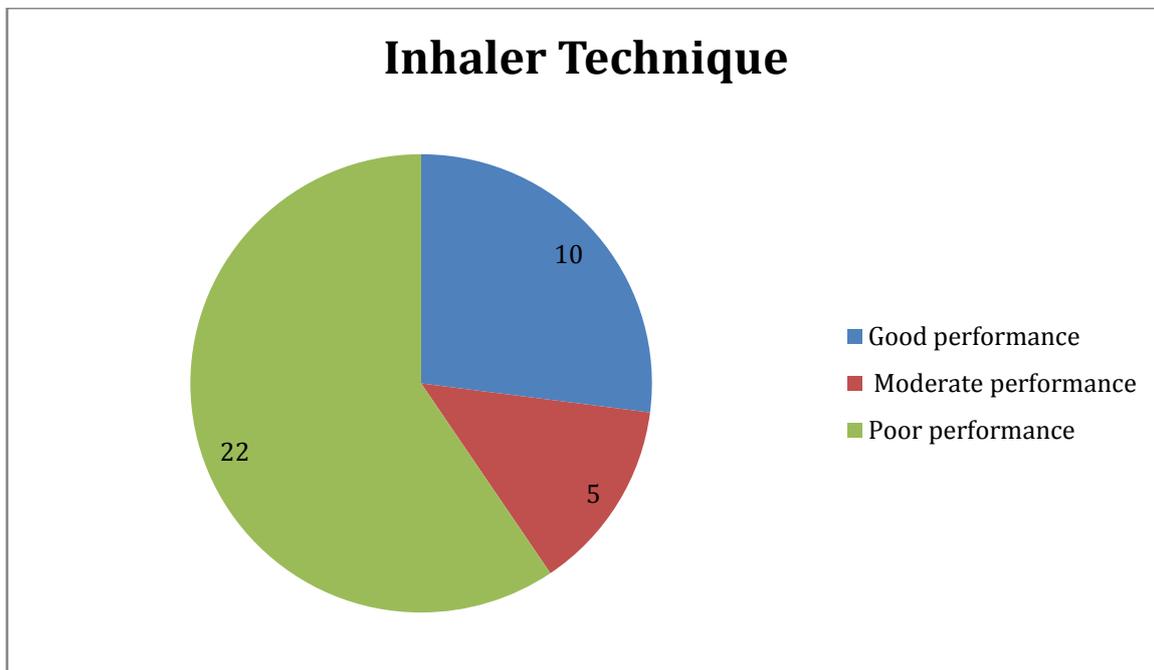
The baseline characteristics collected during the interview did not affect how the patient’s technique was subsequently assessed.

**III. RESULTS:**

Out of 100 patients, only 58 patients were eligible for inclusion in the study. 21 of the 58 eligible patients declined to participate, so 37 patients were enrolled. 21 patients were diagnosed with COPD and 16 were diagnosed with asthma. The mean age of participants was 55 years, 27 (72.9 %) were males and 10 (27%) females. There were no differences in disease stage between patients with Asthma and COPD. No. of medications (all types)  $8.8 \pm 3.2$ . No. of inhaled medications  $2.4 \pm 0.9$ . Duration of inhaler use (years)  $5.6 \pm 6.9$ . For the majority of patients, hospital nursing staff, respiratory therapist, physicians were assisting with administration of inhaled medications in OPD’s visits. 10 out of 37 patients (27 %) were considered good at performance. 5 patients (13.5%) were considered to perform moderately; the majority of patients (59.5 %) showed poor performance regarding correct inhaler technique. All patients with previous training (27% of study patients) demonstrated good knowledge regarding appropriate inhaler technique. Overall 5 patients made critical errors while demonstrating inhaler technique. Patients using the MDI were more likely to make a critical error than patients using rotahalers.

**Table 1:**

	Mean Values
No. of medications	$8.8 \pm 3.2$
No. of inhaled medications (DPIs & pMDIs)	$2.4 \pm 0.9$
Duration of inhaler use (years)	$5.6 \pm 6.9$



**IV. DISCUSSION:**

The majority of patients in this study could not use their inhaler correctly, and there was an association between training and correct use of inhalers. To improve patient’s inhaler skills, health care professionals should ensure patients are trained regarding correct use. In eight studies inhaler training interventions (including such aspects as physical demonstration, technique labels, and written action plans) led to an improvement in inhaler technique and also a significant increase in disease control, (seven in asthma [39, 83, 84, 87, 94, 96, 111], and one in COPD [88]) while 4 studies reported that their intervention significantly improved disease outcomes or reduced hospital admission frequency. In this study the majority of patients received their medications and treatment from pharmacies outside the hospitals where no proper inhaler technique explained. Counselling regarding inhaler technique can play an important role regarding improvement

of patients' ability to use inhaler correctly. Poor knowledge among patients regarding correct use is due to improper follow up visits to out patients. Incorrect inhaler technique among patients affects achievement of treatment outcomes, which leads to increased admission to the emergency department, increasing the cost of illness and decreasing the quality of life. Training programs for community pharmacy dispensers and other health care professionals are potential keys for improving inhaler technique among patients. Counselling and education sessions provided by health care professionals will improve patients' abilities to use inhaler correctly.

## V. CONCLUSION:

The majority of patients in this study could not use their inhalers appropriately. Patients should be educated regarding correct inhaler technique upon dispensing of inhaler medications. Training and educational intervention programs may contribute to the improvement of technique among patients. This study was performed only in with a small sample size; thus, we cannot generalize the results of this study.

## REFERENCES :

- [1]. Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet*. 2020;396(10258):1204–22.
- [2]. Education on Correct Inhaler Technique in Pharmacy Schools: Barriers and Needs - Scientific Figure on ResearchGate. Available from: [https://www.researchgate.net/figure/Inhaler-technique-checklists\\_tbl1\\_264233077](https://www.researchgate.net/figure/Inhaler-technique-checklists_tbl1_264233077)
- [3]. Gregory KL, Elliott D, Dunne P. Guide to aerosol delivery devices for physicians, nurses, pharmacists and other health care professionals[[https://www.aarc.org/wp-content/uploads/2014/08/aerosol\\_guide\\_pro.pdf](https://www.aarc.org/wp-content/uploads/2014/08/aerosol_guide_pro.pdf)]
- [4]. Pritchard JN. Industry guidance for the selection of a delivery system for the development of novel respiratory products. *Expert Opin Drug Deliv*. 2015;12:1755–65.
- [5]. Lavorini F, Usmani OS. Correct inhalation technique is critical in achieving good asthma control. *Prim Care Respir J*. 2013;22:385–6.
- [6]. Wright J, Brocklebank D, Ram F. Inhaler devices for the treatment of asthma and chronic obstructive airways disease (COPD). *Qual Saf Health Care*. 2002;11:376–82.
- [7]. Price D, Marshall J, Turner R. Inhaler use in five european countries: analysis of sales data from Q4 2005 to Q4 2011. *Value Health*. 2012;15:A-PMD92.
- [8]. Price D, Roche N, Christian Virchow J, Burden A, Ali M, Chisholm A, Lee AJ, Hillyer EV, von Ziegenweid J. Device type and real-world effectiveness of asthma combination therapy: an observational study. *Respir Med*. 2011;105:1457–66.
- [9]. Giraud V, Allaert FA, Roche N. Inhaler technique and asthma: Feasibility and acceptability of training by pharmacists. *Respir Med*. 2011;105:1815–22.
- [10]. Garcia-Cardenas V, Sabater-Hernandez D, Kenny P, Martinez-Martinez F, Faus MJ, Benrimoj SI. Effect of a pharmacist intervention on asthma control. A cluster randomised trial. *Respir Med*. 2013;107:1346–55.
- [11]. Barthwal MS, Katoch CDS, Marwah V. Impact of optimal asthma education programme on asthma morbidity, inhalation technique and asthma knowledge. *J Assoc Physicians India*. 2009;57:574–9.
- [12]. Bashedi IA, Armour CL, Bosnic-Anticevich SZ, Reddel HK. Evaluation of a novel educational strategy, including inhaler-based reminder labels, to improve asthma inhaler technique. *Patient Educ Couns*. 2008;72:26–33.
- [13]. Yildiz F, Erbagci A, Demirel YS, Akcali SD, Ekici A, Dursunoglu N, Ediger D, Erdinc M, Cemri SC, Kalyoncu AF, et al. Importance of inhaler device use status in the control of asthma in adults: the asthma inhaler treatment study. *Respir Care*. 2014;59:223–30.
- [14]. Elgendy MO, Abdelrahim ME, Eldin RS. Potential benefit of repeated MDI inhalation technique counselling for patients with asthma. *Eur J Hosp Pharm*. 2015;22:318–22.
- [15]. Grover C, Goel N, Armour C, Van Asperen P, Gaur S, Moles R, Saini B. Medication education program for Indian children with asthma: a feasibility study. *Niger J Clin Pract*. 2016;19:76–84.
- [16]. Ammari W, Al-Hyari N, Obeidat N, Khater M, Sabouba A, Sanders M. Improving paediatrics' pressurised metered dose inhaler technique and asthma control: inhaler verbal counselling vs. Trainhaler. *Thorax*. 2015;70:A-P100.
- [17]. Goris S, Tasci S, Elmali F. The effects of training on inhaler technique and quality of life in patients with COPD. *J Aerosol Med Pulm Drug Deliv*. 2013;26:336–44.

Jyothsna Guguloth, et. al. "Knowledge regarding usage of inhaler technique in Asthma and COPD patients." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 22(1), 2023, pp. 49-52.