

## Evaluation and Training of Inhaler Techniques among Asthmatic Patients

<sup>1</sup>Fatima Rasool, <sup>1</sup>Alia Sehrish, <sup>2</sup>Haji M. Shoaib Khan,  
<sup>2</sup>Naveed Akhtar, <sup>2</sup>Imran Shair Mohammad and <sup>2</sup>Nabila Khalid

<sup>1</sup>University College of Pharmacy, University of The Punjab, Lahore, Pakistan

<sup>2</sup>Pharmacy Department, The Islamia University of Bahawalpur, Pakistan

**Abstract:** Among healthcare providers and asthma patients, Poor inhaler technique is a common problem, which contributes to poor asthma control. This study was performed to assess the adequacy of metered-dose inhaler (MDI) technique in 500 patients. Each patient was asked to show the use of the MDI by taking two puffs from his/her MDI device. We evaluated hospitalized and outdoor patient's inhaler techniques, using specific check-list of nine steps and graded the correctness of each patient's technique before providing the training about use of inhaler as well as after the training. Statistical tools were applied to get the results. In 500 patients 320 (64%) were male and 180 (36%) were female. The frequencies of patients who made error only in essential steps and any step were 35.5% and 44.4%, respectively. Only 20 out of 500 patients (4%) performed all steps correctly. Males performed better than females (52.25% vs. 51.4%) when considered all steps. Only a few patients (4%) showed comparatively better inhaler technique in this study before attending the training session but after getting the training, more than 90% patients follow all steps without any error. Our study suggests that asthmatic patients training by health care professional is possible in everyday practice.

**Key words:** Inhaler technique • Asthmatic Patients • Training

### INTRODUCTION

Long term consequences of poor inhaler techniques, which are frequent in case of asthma, are generally ignored. Asthma controlling treatments such as Bronchodilators and Corticosteroids (ICS) are mostly administered inhalation route to the patients, because by using inhalation routes the desired effects are maximized and potential adverse effects are minimized which are related with systemic administration. However, these benefits can be reversed with challenges faced by patients in using their inhaled devices [1]. It has been observed in different studies about the misuse of prescribed metered-dose inhalers (MDIs) [2].

To demonstrate and direct the patients about correct use of their inhalers, only verbal description of how to use an inhaler is not sufficient [3]. Different studies recommended not only demonstrate use of inhalers but also focused to ask from patients

to demonstrate these techniques [4]. As a health care provider, Pharmacist can teach these specific techniques to patients before the medication is dispensed.

In current study, we observed the inhalation techniques through standard pressurized MDIs (pMDIs) used by asthmatic patients.

### MATERIAL AND METHODS

A total of 500 asthma and COPD patients were evaluated and trained during this study. Each patient was asked to demonstrate the use of the MDI by taking two puffs from his/her MDI device. Using specific check-lists of nine steps and graded the correctness of each patient's technique first before giving the training about the use of inhaler and then after providing the training, we evaluated patient's inhalations technique. Number of attempts was recorded for each patient during the use of inhaler.

Table 1: Evaluation of Metered-Dose Inhaler Technique

Step	Procedure	Error %		
		Male	Female	Total
1*	Remove cap and shake the inhaler vigorously	21.8	22.3	22
2	Breath out slowly and completely	65.6	44.4	58
3	Hold the inhaler in the upright position	31.2	11.1	24
4*	Between closed lips put in the mouthpiece into mouth or up to 4 centimeters in front the open mouth	28.1	33.3	30
5*	Depress the canister once	37.5	72.2	50
6*	Simultaneously start slow deep inhalation continue to total lung capacity (co-ordination)	34.3	50	40
7	Remove the inhaler with closed lips	37.5	33.3	36
8	Hold breath for 10-15 seconds	50	44.4	48
9	Before initiating the second puff, wait for 20-30 seconds	53.1	61.1	56

After training of inhalation techniques by pharmacist, we evaluated the errors committed by the patient before and after the training. International clinical guide lines on MDI technique and manufacturing instructions explained these nine steps which are essential steps need to be considered as shown in Table 1. Proper delivery of inhaled medications, Step 1, 4, 5 and 6 were considered as essential steps while other recommended for maximum delivery of medicine but not considered essential step. The acceptability of each step was defined as follows: The canister must be shaken vigorously by the patient before each puff and the patient should breathe out slowly and completely. If the position of canister was held upright and either inserted between closed lips or up to four centimeters in front of the open mouth, positioning was considered correct. Immediately before pressing the canister once (actuation), patient must then begin a slow inhalation. Including at the same time with the beginning of inhalation, if the actuation (co-ordination) occurred anyplace during the initial third of slow inspiration, the timing of actuation (co-ordination) was considered correct. The inspiration at slow rate must continue on to total lung capacity, afterward the inhaler is detached and the lips remained closed. Before starting the second puff, the patient must wait at least 30 seconds.

**RESULTS**

In 500 patients 320 (64%) were male and 180 (36%) were female. The mean age of patients was 48.05±17.15 years. Nine steps of MDI technique and the percentage of patients who showed the error in technique for each step is shown in Table 1. The frequencies of patients who made error in only essential steps and any step were 35.5% and 44.4%, respectively.



Fig. 1: Percentage Errors in Males and Females

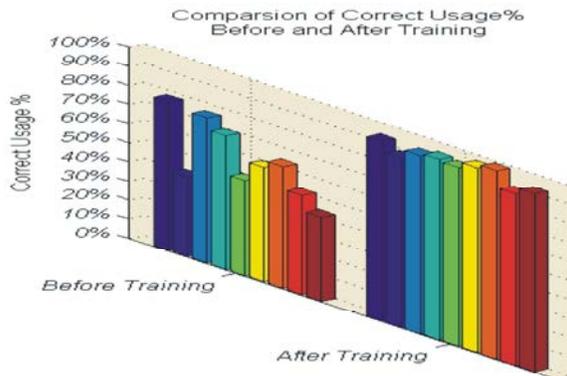


Fig. 2: Comparison of correct usage percentage before and after training

Of the essential steps, depressing the canister once (step 5) had the highest frequency of error (50%), while among non-essential (preferred) steps, highest frequency of errors was observed in breathing out slowly and completely and waiting for 20-30 seconds before initiating the second puff (steps 2 and 9, 58% and 56%, respectively) as shown in figure 1. when all the steps were considered, males performed better than females (52.25% vs. 51.4%).

After the training session more than 90% patients performed all steps without any error as shown in Figure 2.

### DISCUSSION

It was observed from the study that despite the repeated training to patients, they are unable the correct pMDIs technique [5]. In the present study, training provided by us was of comparatively small period and seems to be well-suited in daily practice.

Health care professionals who can provide individual instructions to each patients and demonstration by the patients of above mentioned inhalation techniques must be considered the minimum necessary inhaler training. In addition to providing disposable mouthpieces and placebo, training of all health-care professionals and asthmatic patients using these inhalation device is necessary to get the maximum results.

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