

**EFFECTIVE FACTOR OF THE INHALATION TECHNIQUE IN PATIENTS WITH ASTHMA AND CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD), BAPTIST HOSPITAL, BANGLORE, INDIA**

**Ali Arab**

*Doctor of pharmacy, Department of pharmacy practice, Karnataka College of pharmacy, Bengaluru, India*

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**ABSTRACT**

**Introduction:** Lack of patient compliance with prescribed regimen is an important fascinating problem in medical care, especially in patients suffering from chronic illnesses. Asthma and Chronic Obstructive Pulmonary Disease (COPD) are the two main chronic lung disorders which are particularly vulnerable for medication non-adherence problem.

**Objective:** to study of effective factor of the inhalation technique in patients with asthma and chronic obstructive pulmonary disease (COPD) and to assess the medication adherence in patient with asthma and COPD.

**Methods:** People with asthma or COPD who presented to a community pharmacy with a prescription for a respiratory inhaler were invited to participate in the study. Participants completed a brief questionnaire and had their inhaler technique assessed against a standard checklist. There were 11 steps for MDI and 12 steps for MDI + spacer each correct technique carried a score of 1 and wrong technic carried. The therapeutic inappropriateness of prescribed inhalers and anti-asthmatic drugs is determined with standard guidelines. The prospective study was conducted for period of six months.

**Results:** A total of 120 patients, 56 (46.7%) of which are asthmatics while 64 (53.3%) are COPD patients, were involved. In our study population about 10.8% asthmatics and 20% COPD patients were prescribed with budesonide MDI. About 10% asthmatics and 9.1 COPD patients were prescribed with budesonide MDI+spacer. About 4.1% asthmatics and 2.5% coped patients were prescribed with salbutamol MDI. About 17% asthmatics and 10% copd patients were prescribed with mdi ipratropium and 8% asthmatics and 12.5% coped patients were prescribed with ipratropium MDI+spacer. When the knowledge regarding the usage of inhalers was assessed using standard questionnaire which had 11 steps for MDI and 12 steps for MDI+spacer each questionnaire had scoring of 0 representing not performing the step, 1 representing following the step the scores were high after pharmacist intervention when compared to before pharmacist intervention.

**Conclusion:** We conclude that the results of our study indicated the need for pharmacist interventions Purpose at improving adherence to inhalers in COPD and asthmatic patients also; this study shows that despite the fact that it is a well-known fact that appropriate drug delivery is, key to controlling Asthma and COPD.

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**Introduction**

Drug administration using a metered dose inhaler (MDI) device has become the mainstay of therapy in respiratory disorders, such as asthma and chronic obstructive pulmonary disease (COPD). The advantages offered by this method are financial affordability, convenience, portability, quick and local action, and negligible systemic side effects [1,2]. Chronic Obstructive Pulmonary Disease (COPD) is a progressive condition causing both pulmonary and systemic consequences [1, 3]. The estimated global prevalence in adults aged 40 years and over is 9-10% [4]. Prevalence is projected

**Corresponding Author:** Ali Arab, Doctor of pharmacy, Department of pharmacy practice, Karnataka College of pharmacy, Bengaluru, India

to increase as a result of past high rates of tobacco use, and an ageing population [5,6]. In addition to significant healthcare costs, COPD causes a significant reduction in health-related quality of life [7,8].

In recent years, the prevalence of obstructive pulmonary diseases including asthma and chronic obstructive pulmonary disease (COPD) has shown a steady increase, with a corresponding increase in their social and economic impact. Bronchial asthma and COPD are two chronic obstructive airway diseases that exact an enormous toll on the patients, healthcare providers and the society. India has an estimated 15 to 20 million asthmatics. Rough estimates indicate a prevalence of between 10% and 15% in children in the age range of five to eleven years. The median prevalence rates of COPD were assessed as 5 % for male and 2.7 % for female subjects of over 30 years of age. In India, COPD was accounted for 2.8% of the total deaths in 1990 and it was expected to rise to 6.5% deaths by 2020. Much of the morbidity from asthma is believed to be due to factors such as the denial of having a chronic condition, poor knowledge about the disease process and medication use, poor understanding about the use of inhalers and poor self-management. Patient decisions to follow the recommended treatment are likely to be influenced by their beliefs about medicines, as well as their beliefs about the illness that the medication is intended to treat or prevent [9].

Asthma is bronchial inflammation causing swelling and airways constriction, resulting in breathing difficulties. The bronchial narrowing is usually totally or at least partially reversible with treatments. Asthma is a serious global health problem. The various triggers of asthma are infection, dust mites, molds and mildew, insects, pollens, pets, irritants, stress, smoke, food etc. Asthma is mainly characterized by coughing; wheezing; shortness of breath; chest tightness, pain; PEF changes; URTI [10]. Both the Global initiative for Asthma (GINA) and the Global Initiative for Chronic Obstructive Lung Disease (GOLD) suggest that the correct use of inhalers is an important feature in preventing exacerbations of both asthma and COPD. Several studies have shown that poor use of the inhaler device is a main feature in poorly controlled disease. The pMDI is one of the most commonly used devices in management of asthma and COPD. This can unfortunately be difficult for patients to use and even with repeated demonstration and assessment some patients will still find co-ordination of the whole technique challenging, failing to master it despite repetition. A study performed locally states that 244 asthmatic patients (from a population of >400,000) presented to the emergency department with an acute exacerbation of asthma over a 10 month period, from January to October, of which 51.6% needed medical admission and 8.6% discharged themselves against medical advice. Sub-optimal disease control has a negative impact on patient's quality of life, health care costs and a burden on society [6].

The objectives of the study were to effective factor of the inhalation technique in patients with asthma and chronic obstructive pulmonary disease (COPD), Baptist hospital, Bangalore, India, and to collate the data obtained.

### Materials and Methods

The study was approved by the Department of pharmacy practice, Karnataka College of pharmacy. Study was carried out at OPD of Respiratory medicine among patients diagnosed to have asthma and COPD at Baptist hospital; it was a prospective type of study initiated for 6 months. Patients of COPD and asthma and the general population who visited the hospital were screened for recruitment into this study. To be eligible for the study, the subjects had to:

- Be between the ages of 15 and 60 years
- Know about inhalers as a treatment modality
- Be from the general population who visited the hospital with patients who had some other disease than respiratory disease.
- Be a patient of COPD or asthma.

Those subjects who were above the age of 60 years or below 15 years, those who had not heard about inhalers as a treatment modality, patients who were other than COPD or asthma patients and people who accompanied the respiratory disease patients were excluded from the study.

A total of 120 patients were enrolled in to the study on their visit to the hospital and study duration was 6 months. Medication Adherence, Inhaler technique assessment and Counseling sessions upon enrollment of patients were evaluated for medication adherence. The admission register will be reviewed for prescription of any inhalers and anti-asthmatic and COPD drugs. The case sheet, treatment chart, physician notes will be subjected for capturing any information related to the study. The proper inhalation technique was assessed using the questionnaires there were 11 steps for MDI and 12 steps for MDI + spacer each correct technique carried a score of 1 and wrong technic carried. The therapeutic inappropriateness of prescribed inhalers and anti-asthmatic drugs is determined with standard guidelines. The changes and the daily notes in the case sheets were followed until the patient is discharged. The cost involved in use of inhalers in therapeutic inappropriateness also considered. All data was timely updated and analyzed by using suitable software.

### Results and Discussion

Patients' beliefs and practices play a role in understanding, defining and responding to illness and so our study was aimed at exploring the existing attitudes, beliefs, and perceptions of the patients and the general population with regards to inhalers as a treatment modality. People have different levels of knowledge about the use of inhalers in obstructive pulmonary diseases

disease and diverse underlying disease-related beliefs. The patients' use of inhaler devices and their adherence to the treatment regimens is likely to be influenced by their attitudes, beliefs, and perceptions about inhalers [9].

According to demographic distribution, in our study out of 120 patients 53.3% were diagnosed with COPD and 46.7% were asthmatic, out of which 31.6% were men 15% females were asthmatics and 48.3% males and 5% female were of COPD. 14.1% males and 7.5% female asthmatics were of the age group 46-64 years. 19.1% males and 0.8% females of COPD were of the age group 46-64 years. Among asthmatic patients 7.5% male were smokers and 3.3% men were alcoholic. Among COPD patients 26.6% men were smokers and 5.8% men were alcoholics. Table 1

**Table 1.** Demographics characteristics of asthma and COPD patients in study area

Basic variables	Asthma						COPD					
	Male	(%)	Female	(%)	Total	(%)	Male	(%)	Female	(%)	Total	(%)
No. of patients	38	31.6	18	15	56	46.7	58	48.3	6	5	64	53.3
Age in years												
18-45	8	6.6	3	2.5	11	9.1	16	13.3	2	1.6	18	15
46-64	17	14.1	9	7.5	26	1.6	23	19.1	1	0.8	24	20
>65	13	10.8	6	5	19	5.8	19	15.8	3	2.5	22	8.3
Subtotal	38	31.6	18	15	56	6.6	58	48.3	6	5	64	53.3
Duration of disease(year)												
<1	7	5.8	6	5	13	0.8	11	9.1	21	7.5	32	6.6
1-10	22	8.3	11	9.1	33	7.5	28	23.3	4	3.3	32	6.6
≥11	5	4.1	1	0.8	6	5	19	15.8	1	0.8	20	1.6
Subtotal	34	8.3	18	15	52	43.3	58	48.3	26	1.6	84	70
Social habits												
Smoker	9	7.5	0	0	9	7.5	32	26.6	0		32	6.6
alcoholic	4	3.3	0	0	4	3.3	7	5.8	1	0.8	8	6.6

In our study population about 10.8% asthmatics and 20% COPD patients were prescribed with budesonide MDI. About 10% asthmatics and 9.1 COPD patients were prescribed with budesonide MDI+spacer. About 4.1% asthmatics and 2.5% COPD patients were prescribed with salbutamol MDI. About 17% asthmatics and 10% COPD patients were prescribed with mdi ipratropium and 8% asthmatics and 12.5% COPD patients were prescribed with ipratropium MDI+spacer. Table 2

**Table 2.** utilization pattern of inhalers in study population

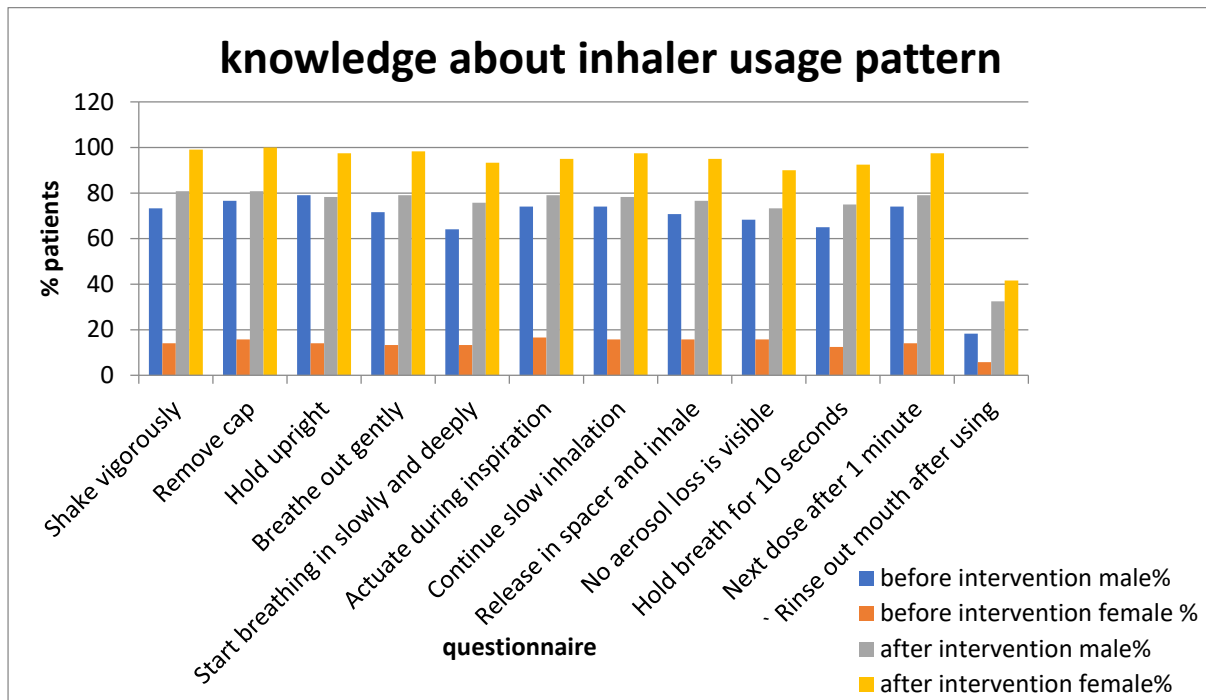
Class of drug	Name of the drug	Dosage form	Asthma (n=56)						COPD (n=64)					
			M	%	F	(%)	Total	%	M	%	F	(%)	Total	%
corticosteroids	budesonide	MDI	12	10	1	0.8	13	0.8	23	19.1	1	0.8	24	20
		NEBULIZER	4	3.3	0	0	4	3.3	2	1.6	0	0	2	1.6
		MDI+SPACER	9	7.5	3	2.5	12	10	7	5.8	4	3.3	11	9.1
Beta 2 agonists	salbutamol	MDI	4	.3	1	0.8	5	4.1	3	2.5	0		3	2.5
Leukotriene modifiers	Montelukast	Tablet	36	30	9	7.5	45	7.5	7	5.8	2	1.6	9	7.5
Methyl xanthanes	Theophylline	Tablet	86	7.2	5	4.1	91	0.7	30	25	4	3.3		8.3
Mucolytics	Guaifenesin	Syrup	2	1.6	4	3.3	6	5	5	4.1	2	1.6	7	5.8
Antihistamine	Cetirizine	Tablet	12	10	1	0.8		10.8	2	1.6	1	0.8	3	2.51
Anticholinergics	Ipratropium bromide	MDI	17	14	0	2.5	17	4.1	10	8.3	2	1.6	12	10
		MDI+SPACER	5	4.1	3		8	6.6	14	11.6	1	0.8	15	12.5

When the knowledge regarding the usage of inhalers was assed using standard questionnaire which had 11 steps for MDI and 12 steps for MDI+spacer each questionnaire had scoring of 0 representing not performing the step, 1 representing following the step the scores were high after pharmacist intervention when compared to before pharmacist intervention. Table 3).

**Table 3.** Study of inhalers adherence among the study population

Type of inhalers	Dose recommended per day	Asthma (adherence %)		COPD(Adherence %)	
		Male %	Female %	Male %	Female %
Budesonide MDI	0.5-1mg 2times	80	80	86	55
Ipratropium bromide MDI	34mcg 4 times	52.9	26.4	58.6	56.1
O2 inhaler MDI	1 puff	100	96	94	100
Salbutamol MDI	180-216mcg	92.5	86.3	95	91.2
Salmetrol MDI	50-250mg 2 times	90	89.7	98.2	93.6
Budesonide MDI+spacer	0.5mg 2 times	76.7	83.4	86	84.9
Ipratropium bromide MDI+spacer	34mcg 4 times	54.8	56.1	48.3	33.6
salbutamol MDI+spacer	180-216mcg	95.6	93.8	91.6	96.1

**Fig 1.** Bar chart representation to assess the knowledge of inhaler usage in study population before and after pharmacist intervention



In our study adherence to inhaler therapy was assessed by using the formula correct dose/incorrect dose\*100 and the following were the adherence % for the inhaler drugs budesonide mdi 80% among both male and female asthmatics 86% males and 55% females were prescribed with budesonide mdi among copd. 76.7% males and 83.4% female’s asthmatics are prescribed with budesonide mdi+spacer 86% males and 84.9% females COPD patients are prescribed with mdi+spacer (Fig 1). In a retrospective study by thamby SA et al. on drug utilization pattern in asthmatics it is seen that the study focused on both smoker and non-smoker asthmatics. It was observed that salbutamol was most commonly prescribed, followed by montelukast and prednisolone. In the combination therapy, the most commonly prescribed was Symbicort, followed by seretide and combivent. Corticosteroids constituted the most prevalent class, followed by beta-2 agonists, leukotriene modifiers and methylxanthines. The study presented the most recent scenario on drug utilization pattern of asthmatics in Kedah state [11]. The reasons for non-adherence were noted where 6.6% were not adherent due to high cost of medicine 0.8% due to lack of access to hospital drug store, 4.1% due to fear of side effects, 10% felt better and stopped, 1.6% forgotten / occupational problems, 3.3% lack of family support, 5% didn’t adhere due to fear of becoming dependent on treatment (Fig 1). In a similar study by Fugate AR on medication adherence in COPD and asthma patients it was found that The major reported reasons to stop/miss medication were felt better and stopped (64.81%) because asthma and COPD has symptomatic treatment, so whenever feel better they stop the medicine, forgetfulness (55.55%), expensive (42.59%) and lack of access to drug store/hospital (31.48%). Other minor reasons were lack of family support/Motivation, fear of side effects, feel non beneficial. The same reasons were reported in previous studies.

**Conclusion**

We conclude that the results of our study highlighted the misplaced beliefs, attitudes and perceptions about inhalers among a majority of the first contact patients and the common population which are more prevalent in females, compared to the males. We feel that such misplaced beliefs, attitudes and perceptions about inhalers among a majority of subjects will definitely inhibit the proper utilization of inhaler therapy.

The present results indicated the need for pharmacist interventions aimed at improving adherence to inhalers in COPD and asthmatic patients also; this study shows that despite the fact that it is a well-known fact that appropriate drug delivery is key to controlling Asthma and COPD.

Overall medication adherence and inhaler technique improvement was found to be statistically significant in asthma and COPD patients after counseling by pharmacist.

The major reasons for medication non-compliance were felt better and stopped, high cost of medication, forgetfulness and lack of access to drug store/hospital.

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