ADEQUACY OF INHALER TECHNIQUE IN THE PATIENTS OF COPD AND ASTHMA

Shams ur Rehman[1], Amanullah[2], Nazir shah[2], Muhammad Usman[2], Amjad Mehboob[1], Tariq Zubair[1], Mohammad Adil Sardar[1]

ABSTRACT

Objectives: Determining the adequacy of Inhaler technique in COPD and Asthma patients presenting to pulmonary ward and its association with response to medication.

Background: Incorrect technique when taking inhaled medications frequently prevents patients with Asthma or Chronic Obstructive Pulmonary Disease (COPD) from receiving the maximal benefit from their medications. Regardless of the type of inhaler device prescribed, patients are unlikely to use inhalers correctly unless they receive clear instruction, including a physical demonstration. New high-quality evidence has confirmed that asthma and COPD control can be improved by brief verbal instruction and physical demonstration of correct inhaler technique, taking only a few minutes and repeated regularly.

Methodology: Eighty patients were enrolled from the Medical unit of Hatyatabad Medical complex from Oct 2014 to April 2015. All the patients were using metered dose inhalers (MDI) for their asthma or COPD control. Their technique of using the inhaler was directly observed by the same doctor. They were asked about the response/ benefits of the inhalers.

Results: There were 80 participants,48 with asthma and 32 with COPD.66.25% used standard pressurized metered dose inhaler with spacer and 33.75% pMDI alone. The majority of patients received their initial inhaler technique instruction from their doctor .Over half of the participants did not recall having their inhaler technique rechecked. About forty-four percent (43.75 %) of the patients exhibited correct inhaler technique.

Conclusion: More than half of the patients do not know the exact method of inhaler use. Therefore the patients usually do not get the required benefits from the inhaler use.

Keywords: Inhaler, COPD, Asthma,

INTRODUCTION

COPD and asthma are the two types of obstructive lung disease.COPD include chronic bronchitis and emphysema[1]. Chronic bronchitis is defined by a productive cough that lasts greater than three months each year for at least two consecutive years in the absence of other underlying disease. Whereas emphysema is defined by obstructive lung disease caused by permanent dilation of all or part of respiratory unit. It has two types centriacinar(terminal bronchioles and respiratory bronchioles are the site of elastic tissue destruction) and panacinar(terminal bronchiole and whole of the respiratory unit involved).The two etiological factors implicated are smoking(centriacinar type) and AAT deficieny (Panacinar type).The major symptoms of COPD are SOB,cough and sputum production.[2]

[1] Department of Medicine,Gajju Khan Medical College Swabi, KPK - Pakistan.
[2] Department of Medicine, Hayatabad Medical Complex, Peshawar - Pakistan.

Address for correspondence:
Dr. Shams ur Rehman
Department of Medicine,Gajju Khan Medical College Swabi,KPK,Pakistan.
E-mail: drshamskhan@yahoo.com

The prevalence of chronic bronchitis in Pakistan in patients over 65 is 14% and 6% in rural females and males, respectively, and 9% (with no sex difference) in urban areas. The higher rates of chronic bronchitis observed in females in rural areas may be attributed to high levels of indoor air pollution due to cooking over smoking fires. It is estimated that 36% of adult males, and 9% of females smoke, and the cigarette consumption per person per year in Pakistan is among the highest in South Asia[3] which is one of the most important risk factor in developing COPD.[4]

Asthma is a common chronic inflammatory disease of the airways characterized by variable and recurring symptoms, reversible airflow obstruction and bronchospasm. Common symptoms include wheezing, coughing, chest tightness, and shortness of breath.[5, 6]

Prevalence of adult asthma was 10.8% in this study population. The prevalence of perceived work-related asthma was 5.3% .[7]

Medications with inhalers:Inhaled bronchodilators(beta-2 agonists-albuterol/salmetrol[8] and anticholinergics-ipratropium bromide)[9] and inhaled corticosteroids(budesonide/fluticasone)[10] form the mainstay of treatment along with lifestyle modification. Although effective treatment is available but adherence issue and suboptimal inhaler technique results in failure of optimal

management of the disease.[11, 12, 13]

METHODOLOGY:

This was a cross-sectional study which was performed in the medical unit of Hayatabad medical complex and medical unit of Gajju khan medical college Sawabi from Oct 2014 to April 2015. Eighty patients of asthma and COPD were selected from the medical OPD. Their technique of using the prescribed inhaler was checked according to the checklist given below (Table-3). Correct technique was labeled as fulfilling the 5 steps out of 8 of the checklist. Comparison regarding the response to inhaler was made between the patients with correct use and those with incorrect use. The data was collected in a pre formed Performa and was analyzed. Patients with chronic lung diseases other than asthma and COPD were excluded from the study.

RESULTS:

Following are the results of the study.

Note: Good technique was defined as having at least five out of eight steps correct, including all three essential steps on the checklist for inhaler technique . Poor technique was defined as not reaching the standard defined as good technique.

Overall 43.75 % patients exhibited correct inhaler technique. Among the patients who used pMDI without spacer 44.44 % exhibited good technique and among the patients who used pMDI with spacer, 43.39 % showed correct technique. So there was no significant difference in the results as far as the type of inhaler used by patients is concerned.

Response to medication was termed unsatisfactory when the patient had recurrence of symptoms i.e Dyspnea, productive cough, chest tightness inspite of compliance to medication.

So according to the study out of 35 patients who used correct technique and were complaint to medication 26 patients had no or minimal symptoms (74.28 %) and out of 45 patients who had faulty technique only 7 patients had good control of their symptoms (15.55 %). The data suggested that adequate inhaler technique is very important in assuring that optimal drug amount reaches its site of action and produce satisfactory response.

DISCUSSION:

After prescribing appropriate therapy, correct inhaler technique is a cornerstone of achieving adequate therapy. Study has shown that improper technique of inhaler medication leads to only minimal relief from symptoms and patients frequently report complaints of dyspnea, wheezing, cough etc. Rechecking inhaler technique is a gap in care that needs to be addressed from an interdisciplinary perspective.

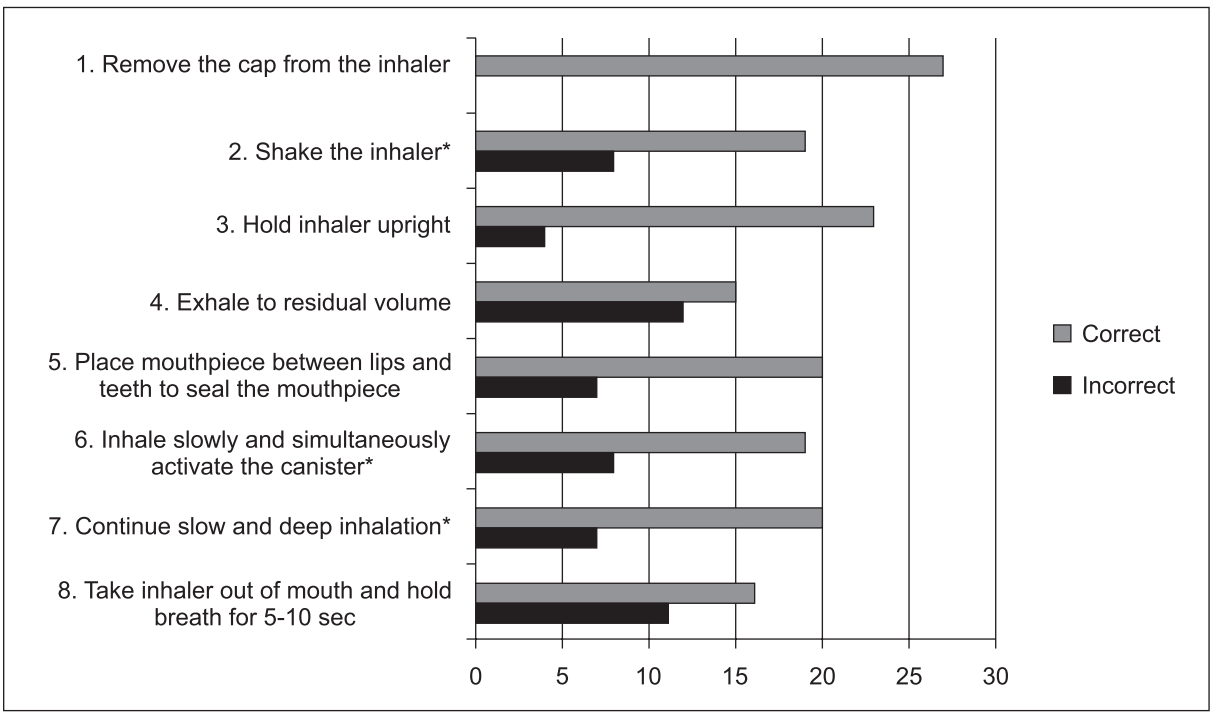
The drug effectiveness in COPD and Asthma patients immensely depends upon correct inhaler technique. If the inhaler technique is faulty then significant amount of drug will never reach its sight of action and is lost and in spite of compliance patients will not respond to therapy.[15] Following is a brief literature discussion of the correct inhaler technique for both pMDI alone and with a spacer. This checklist was developed from guidance issued by the National Asthma Council Australia pharmaceutical industry leaflets and training provided by Asthma Auckland.[18] It is important to know how much medication is left in inhaler. Most inhalers have counting devices built in. There are a few inhalers that do not have a built-in counter. For these, you must keep track of how many puffs you have used, including priming puffs. The number of puffs contained in your

Sample Size: 80 patients including both COPD and Asthma

Characteristics	Participants with asthma (n=48)	Participants with COPD (n=32)	Total participants (n=80)
Mean age in years	37.8 years	66.3 years	44.3 years
	(Range : 18-88)	(Range: 35-89)	(Range : 18-89)
Gender			
Male,n(%)	20 (41.6%)	21 (65.6%)	41 (51.25%)
Female,n(%)	28 (58.4%)	11 (34.4%)	39 (48.75%)

Type of inhaler	Correct technique	Incorrect technique	Total number of patients
pMDI	12	15	27
pMDI with spacer	23	30	53

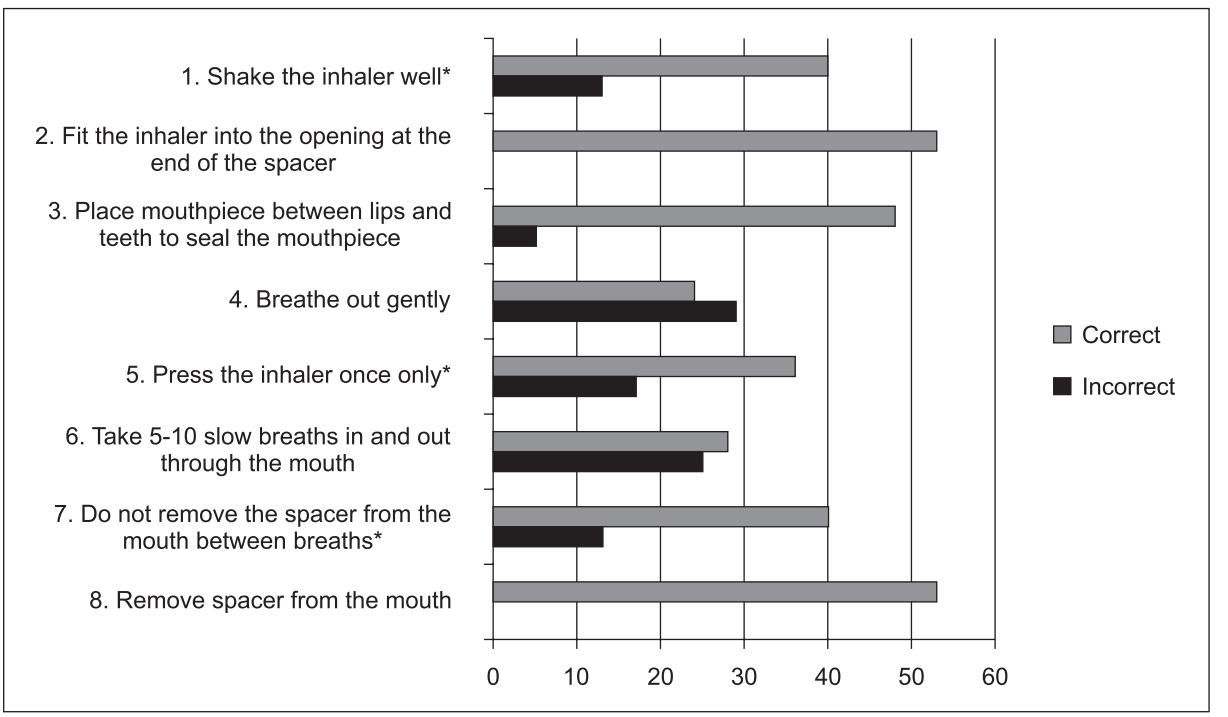
Participants' pMDI use assessed against the eight steps for correct use in the checklist



Number of patients.

Note: The steps marked with asterisk are considered essential.

Participants' pMDI with spacer use assessed against the eight steps for correct use in the checklist.



Number of patients.

Note: The steps marked with asterisk are considered essential.

Association of inhaler technique with control of symptoms of COPD and Asthma

Inhaler technique	satisfactory response to medication	Unsatisfactory response to medication.
Correct technique	26	09
Incorrect technique	07	38

MDI is printed on the side of the canister. If you use an MDI every day for control of symptoms, you can find out how long it will last by dividing the total number of puffs in the inhaler by the total puffs you use every day. For example: 2 puffs x 2 times per day = 4 total puffs per day. If there are 120 puffs, the MDI will last 30 days. If you use an inhaler only when needed, keep track of how many times you spray the inhaler.For convenience, there are counting devices that attach to the inhaler that will keep track of how often your inhaler is sprayed.[19]

Checklist for optimum inhaler technique: pMDI[16]

- Remove the cap from the inhaler.
- Shake the inhaler*
- Hold inhaler upright
- Exhale to residual volume
- Place mouthpiece between lips and teeth to seal the mouthpiece
- Inhale slowly and simultaneously and activate the canister*
- Continue slow and deep inhalation*
- Take inhaler out of mouth and hold breath for 5-10 seconds

pMDI with spacer [16]

- Shake the inhaler well*
- Fit the inhaler into the opening at the end of the spacer
- Place mouthpiece between lips and teeth to seal the mouthpiece
- Breathe out gently
- Press the inhaler once only*
- Take 5–10 slow breaths in and out through the mouth
- Do not remove the spacer from the mouth between breaths*
- Remove spacer from the mouth

Note: The steps marked with asterisk are considered essential.[16, 17]

CONCLUSION:

This study shows that a significant percentage of participants had incorrect inhaler technique which is consistent with other studies.[19, 20, 21] pMDI with spacer was the more common device in use by participants. The most common error in both the devices was failure to exhale adequately before administering the dose. The study did not show any specific factors that contribute to poor inhaler technique overall. An important finding was that less than half of the participants had received a reassessment of their inhaler technique. There is a need for reinforcement of inhaler technique through an interdisciplinary approach. Correct technique will not only reduce the symptoms but will also prove to be cost effective in the shape of less admissions , less stay in hospital, and decreased dosage requirement. Studies have shown that almost everyone can learn proper inhaler technique with adequate training and practice. Its important to properly teach the inhaler technique at the time of prescribing and then periodically check if the patients are following the correct technique [22,23,24]. Delivery of inhaler technique education involves two main processes: evaluation of the inhaler technique; and provision of feedback on erroneous steps. Specifically, this involves HCPs observing how the patient uses their inhaler and comparing this technique with an inhaler technique checklist. Depending on the ability of the patient to use the inhaler correctly, the HCP provides specific feedback on how to rectify the errors. It has been found that the nature of this feedback has significant impact on its effectiveness.This suggests that, when reviewing the inhaler technique education delivered to patients, it is important to review the concept of 'feedback.[25]

REFERENCES:

1. http://www.mayoclinic.org/diseases-conditions/copd/basics/causes/con-20032017
2. Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease. Global Initiative for Chronic Obstructive Lung Disease. pp. 1–7
3. Systems for the management of respiratory disease in primary care – an international series: Pakistan*Mohammed Osman Yusufa
4. Not 15 But 50% of smokers develop COPD?—Report from the Obstructive Lung Disease in Northern Sweden Studies B LUNDBÄCK Correspondence should be addressed to: Bo Lundbäck, MD, PhD, Associate

Professor, Lung and Allergy Research, National Institute of Environmental Medicine, Karolinska Institutet, SE 171 77 Stockholm, Sweden. Fax: +46-8-303390; E-mail: bo.lundback@telia.com

5. NHLBI Guideline 2007, pp. 11–12

6. British Guideline 2009, p. 4

7. Prevalence and determinants of asthma in adult male leather tannery workers in Karachi, Pakistan: A cross sectional study.Khurram Shahzad12*, Saeed Akhtar13 and Sadia Mahmud1

8. Decramer M, Janssens W, Miravitlles M (April 2012). "Chronic obstructive pulmonary disease". Lancet 379 (9823): 1341–51. doi:10.1016/S0140-6736(11)60968-9. PMID 22314182.

9. Karner C, Cates CJ (2012). "Long-acting beta(2)-agonist in addition to tiotropium versus either tiotropium or long-acting beta(2)-agonist alone for chronic obstructive pulmonary disease". In Karner, Charlotta. Cochrane Database Syst Rev 4: CD008989

10. Gartlehner G, Hansen RA, Carson SS, Lohr KN (2006). "Efficacy and Safety of Inhaled Corticosteroids in Patients With COPD: A Systematic Review and Meta-Analysis of Health Outcomes". Ann Fam Med 4 (3): 253–62. doi:10.1370/afm.517. PMC 1479432. PMID 16735528.

11. Health promotion and maintenance for patients with chronic obstructive pulmonary disease: a review. Windsor RA, Green LW, Roseman JM Chronic Dis. 1980; 33(1):5-12. [PubMed] [Ref list]

12. Factors associated with medication nonadherence in patients with COPD.George J, Kong DC, Thoman R, Stewart K.Chest. 2005 Nov; 128(5):3198-204. [PubMed] [Ref list]

13. Medication adherence patterns in chronic obstructive pulmonary disease.Dolce JJ, Crisp C, Manzella B, Richards JM, Hardin JM, Bailey WCChest. 1991 Apr; 99(4):837-41.[PubMed] [Ref list]

14. http://www.wma.net/en/30publications/10policies/b3/

15. http://www.nationalasthma.org.au/uploads/content/237-Inhaler_technique_in_adults_with_asthma_or_COPD.pdf

16. National Asthma Council Australia. Inhaler technique in adults with asthma or COPD. Melbourne, Australia: National Asthma Council Australia; 2008; [cited 2011 Feb 17]. Available from: http://www.nationalasthma.org.au/content/view/595/1030/.

17. http://www.nlhep.org/Style%20Library/PageSets/PageSet-Save_Your_Breath/7D-metered-dose-inhalers.html

18. Inhaler technique education: practical strategies and research evidence.Associate Professor Helen Reddel.Research Leader, Woolcock Institute of Medical Research.Respiratory Physician, The Asthma Centre, RPAH

19. http://my.clevelandclinic.org/health/medicaldevices/hic_How_to_Use_a_Metered_Dose_Inhaler

20. Improper inhaler technique is associated with poor asthma control and frequent emergency department visits .Hamdan AL-Jahdali14*, Anwar Ahmed2, Abdullah AL-Harbi1, Mohd Khan1, Salim Baharoon1, Salih Bin Salih1, Rabih Halwani3 and Saleh Al-Muhsen3

21. Adequacy of inhaler technique used by people with asthma or chronic obstructive pulmonary disease. Linda Bryant MClinPharm, PhD;1 Christine Bang BPharm;2 Christopher Chew BPharm;2 Sae Hee BaikBPharm;2 Diane Wiseman MClinPharm2

22. Asthma patients' inability to use a pressurised metered-dose inhaler (pMDI) correctly correlates with poor asthma control as defined by the Global Initiative for Asthma (GINA) strategy: a retrospective analysis .*Mark L Levy1, Alison Hardwell2, Eddie McKnight2, John Holmes3

23. Predictors of incorrect inhalation technique in patients with asthma or COPD: a study using a validated videotaped scoring method.Geert N Rootmensen ,Anton R J van Keimpema , Henk M Jansen Rob J de Haan. Department of Pulmonology, Academic Medical Centre, Amsterdam, The Netherlands. Journal of Aerosol Medicine and Pulmonary Drug Delivery (Impact Factor: 2.89). 10/2010; 23(5):323-8. DOI: 10.1089/jamp.2009.0785 Source: PubMed

24. Exploring the role of quantitative feedback in inhaler technique education: a cluster-randomised, two-arm, parallel-group, repeated-measures study. Mariam Toumas-Shehata ,David Price, Iman Amin Basheti & Sinthia Bosnic-Anticevich