A Comparative Study On Inhaler Use Among Bronchial Asthma And COPD Patients

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Abstract: Background: Bronchial Asthma and COPD are among the cause of substantial morbidity and mortality, the treatment and control of which is hampered by incorrect use of inhaler. Methodology: Present study is a part of another hospital based study conducted among the patients using DPI, attending the OPD and IPD of department of TB & Chest diseases, FH Medical College Hospital. The secondary analysis was done to compare the inhaler use technique among Bronchial Asthma and COPD patients. The subjects were selected non-randomly (purposely), and observed by a single observer, while they were using the inhaler. The steps were noted at which the subjects were observed to be performing incorrectly, in a pre-tested structured format. Results: The mean age was observed to be significantly higher in COPD patients (53.5±12.0 years) as compared to that of bronchial asthma patients (46.9±17.5 years). Higher proportion of bronchial asthma patients (20%) were found to be using the inhaler correctly, as compared to COPD patients (11.8%), though it was not found to be statistically significant (p>0.05). Among the bronchial asthma patients, the most frequent mistake was made during breath holding after inhalation (68%), while among COPD patients, most crucial steps were slow exhalation i.e. step 4 and forceful inhalation through the mouth i.e. step 5 (72.9%). Conclusion: Incorrect usage of inhalers is widely prevalent among its users, which is not related to the diagnosis for which it is prescribed. [Khan M NJIRM 2016; 7(2):37-40]

Key Words: Inhaler Technique, DPI, COPD, Asthma.

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Introduction: The non-communicable diseases are now the leading cause of morbidity and mortality globally. Respiratory diseases constitute an important cause of concern in this context, claiming to be about 4 million deaths globally annually [1]. India is no longer an exception to this global trend while the morbidity from respiratory diseases has been estimated to be about 17.23 and 14.84 million cases of COPD and bronchial asthma respectively, as reported in a multi-centric study conducted across different parts of India[2]. Currently the mainstay of the treatment for both bronchial asthma as well as COPD is Inhaled therapy[3, 4]. While the correct treatment and the compliance of the patient are the factors that are required for controlling the disease severity; correct and proper use of the inhaler device by the patient is another issue that is equally important as well as overlooked one. In a systematic review it has been reported that between 4 and 94% of patients using a DPI do not use it correctly while as much as 25% have never received inhaler-technique training [5].

Inhalation therapy guidelines have been prescribed for each type of inhaled therapy. The steps to be taken for dry powder inhaler devices are as follows[6]: 1. Take the cap off (some do not have a cap). 2. Follow the dose preparation instructions in the PIL. 3. Do not point the mouthpiece downwards once a dose has been prepared for inhalation because the dose could fall out. 4. Exhale slowly, as far as comfortable (to empty the lungs). Do not exhale into the DPI. 5. Start to inhale forcefully through the mouth from the very beginning. Do not gradually build up the speed of inhalation. 6. Continue inhaling until the lungs are full. 7. At the end of the inhalation take the inhaler out of the mouth and close the lips. Continue to hold the breath for as long as possible, or up to 10s. 8. Breathe normally. 9. If another dose is required, repeat steps 1-8.

Present study is a part of another study that was conducted among patient using DPI, presenting to the department of TB & Chest Diseases, FH Medical College & Hospital, Tundla, Firozabad (Uttar Pradesh) India. The aim of the present study was to compare the inhaler use technique among the two groups. The secondary analysis was done to compare the correctness of inhaler technique among the patients of bronchial asthma and chronic obstructive respiratory disease (COPD).

Material and Methods: Hospital based study. Purposive (non-random) sample of patients attending the department of TB and Chest Diseases, FH Medical College & Hospital, Tundla, Firozabad, UP. Patients attending the OPD as well as IPD, fulfilling the inclusion criteria were included consecutively.

Duration of the study: 3 months.

Inclusion Criteria: Adult Patients of Bronchial Asthma and COPD using DPI's for 1 month or more, who give informed consent.

Exclusion Criteria: Patients using DPI for less than 1 month, patients using devices other than DPI or patients admitted with acute exacerbations. Patients were asked to demonstrate the inhalation technique which was observed by a single observer and errors made by patients at individual steps were recorded. Proper training and counselling was provided to patients.

Statistical Analysis: Data collected so was presented as frequencies and proportion in tabular form. Appropriate test of significance such as independent t test, chi square test and Fischer's exact test were used, wherever applicable.

Ethical Consideration: Formal approval taken from the institutional ethical committee, FH Medical College & Hospital, Tundla, Firozabad (U.P.).

Results: Among the total 94 subjects, 35 patients were diagnosed cases of bronchial asthma while 59 were suffering from chronic obstructive pulmonary disease (COPD). Table 1 shows a comparison of different parameters between the two groups. The mean age of the study subjects was found to be 51±14.6 years which was observed to be significantly higher in COPD patients (53.5±12.0 years) as compared to that of bronchial asthma patients (46.9±17.5 years). The proportion of bronchial asthma patients was found to be maximum from the age group of less than 40 years while COPD patients were highest from the age group more than 60 years. Males outnumbered the females in both the groups. Maximum subjects in both the groups were from the urban areas. In both the groups, highest proportion of subjects were illiterate.

As shown in table 1, among the total study participants, correct inhaler technique was observed in 14.9% (14/94) subjects only. Higher proportion of bronchial asthma patients (20%) were using the inhaler correctly as compared to COPD patients (11.8%), though it was not found to be statistically significant (p>0.05). table 3 shows the comparison of mistakes made at individual step, between the two groups. Among the bronchial asthma patients, the most frequent mistake was made during breath holding after inhalation (68%) i.e. step 7, followed by slow exhalation (step 4) and step 5 i.e. forceful inhalation through the mouth (65.7%). For the COPD patients, most crucial steps were slow exhalation (step 4) and step 5 i.e. forceful inhalation through the mouth (72.9%). Higher proportion of bronchial asthma patients (51.4%) were unable to perform 'continued inhalation until lungs were full' as compared to COPD patients (40.7%).

Table 1: Comparison of different parameters between the patients of Bronchial Asthma and COPD among the study participants (N=94).

Variable	Bronchial Asthma (35)	COPD (59)	p
Mean Age (years)	46.9±17.5	53.5±12.0	0.032
Age Group			
≤40 Years (28)	15 (42%)	13 (22%)	0.100
40-49 Years (18)	04(11.4%)	14 (40%)	
50-59 Years (22)	09(25.7%)	13 (22%)	
≥60 Years (26)	07 (20%)	19(54.3%)	
Sex			
Male (66)	25(71.4%)	41(69.5%)	0.843
Female (28)	10(28.6%)	18(30.5%)	
Area of Residence			
Rural (41)	16(45.7%)	25(42.4%)	0.752
Urban (53)	19(54.3%)	34(57.6%)	
Educational Status			
Illiterate (39)	15(42.8%)	24(40.7%)	0.020
Primary & middle school (21)	08(22.8%)	13 (22%)	
High-school& Intermediate (27)	07 (20%)	20(33.9%)	
Graduate & above (07)	05(14.4%)	02 (3.4%)	
Guide			
Doctor (45)	07 (20%)	38(64.4%)	0.001
Nurse (09)	05(14.4%)	04 (6.8%)	
Pharmacist (13)	08(22.8%)	05 (8.5%)	
Others (27)	15(42.8%)	12(20.3%)	

Table 2: Comparison of Correct Inhaler technique between bronchial asthma and COPD subjects among the study participants (N=94)

Correctness of Inhaler Technique	Frequency (%)		p
	Br. Asthma (n=35)	COPD (n=59)	
All Steps Correct	07 (20%)	07 (11.8%)	0.563
1-3 steps incorrect	08 (22.9%)	15 (25.5%)	
4-7 steps incorrect	20 (57.1%)	37 (62.7%)	

Table 3: Comparison of mistakes made at individual steps, between bronchial asthma (n=35) and COPD (n=59) subjects among the study participants.

Description of step	Frequency of mistake		p
	Bronchial Asthma n (%)	COPD n (%)	
Dose preparation	07 (20)	06 (10.2)	0.182
Correct position of inhaler	08 (22.9)	13 (22)	0.926
Slow exhalation	23 (65.7)	43 (72.9)	0.463
Forceful inhalation through the mouth	23 (65.7)	43(72.9)	0.655
Continuing to inhale until lungs are full	18 (51.4)	24 (40.7)	0.311
Breath holding after inhalation	24 (68.6)	41(69.5)	0.926

Discussion: Present study is a hospital based study that was conducted among patients attending the department of TB & Chest diseases, in a tertiary care hospital, to compare the correctness of inhaler technique among bronchial asthma and COPD patients. Overall a great majority of the subjects were using the inhaler incorrectly while only 14% were observed to be performing all steps correctly. No significant difference was observed between the overall correct inhaler techniques among bronchial asthma and COPD patients, however the former group appeared to be performing better than the later.

In our study, the most frequent steps performed incorrectly were noted to be; breath holding after inhalation step among bronchial asthma patients while slow exhalation and forceful inhalation through the mouth among COPD patients. While overall, forceful inhalation through the mouth was observed to be most crucial step. Similar to ours, in another study about 16% DPI users were found to be performing inhaler technique incorrectly[7]. In a study, the step at which most subjects found to be making mistake was noted to exhalation, while about 21% users were found to be inhaling incorrectly[8]. In another study conducted among asthma patients, about 30% subjects were found to be using their inhaler correctly[9].

Conclusion: A great majority of both bronchial asthma and COPD patients were observed to be using the inhaler incorrectly in our study which highlights the importance of proper training and follow up of subjects. Patients should be thoroughly trained for inhaler use and the same should be ensured at every visit. Considering the shortage of time with the attending physician it may be recommended that other paramedical worker to be deputed for training and counselling the patients regarding inhaler use.

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