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# Qualitative assessment of impact of interventions on rotahalor using technique in the patients of bronchial asthma and chronic obstructive pulmonary disease at a tertiary care hospital of rural Maharashtra

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ABSTRACT

**Introduction**: Inhalation mode of drug delivery is the mainstay treatment for COPD and asthma; however incorrect technique prevents patients from receiving proper benefits of inhalational drug therapy.
**Objective:** The study was aimed to study the practice of rotahalor inhalation technique in patients with asthma and COPD and to determine the effects of interventions on these techniques through demonstration and videos.
**Materials and Methods**: With the help of standardized checklist, patients were assessed initially. Then, they were trained with proper techniques using demonstrations and videos. Comparison of pre and post-interventional scores and $FEV_1$ scores was done.
**Analysis:** This was done using Paired "t" test. Pre and post-interventional values and FEV1 values were compared. Data was analyzed using Statistical Package for Social Sciences (SPSS) version 21.
**Results:** Overall, the Inhalation techniques of patients were found incorrect. Pre and post-interventional values and FEV1 values were compared and found highly significant. Post-interventional 54.54% patients could get all the 10 steps correct. Similarly, Mean FEV1 before and after intervention were found significantly different.
**Conclusion:** Asthma and COPD patients still don't use rotahalor inhalational technique correctly which therefore doesn't provide maximal benefits of therapy. Thus, proper counselling and training should be given to the patient as it may improve quality of their life.



## 1. Introduction

Bronchial Asthma and Chronic obstructive pulmonary disease (COPD) are common chronic respiratory diseases with significant morbidity and mortality globally. The management consists of short acting beta 2-adrenergic agonists, anticholinergics, inhaled corticosteroids, antibiotics and mucolytics.[1] Especially inhaled medications are mainstay of treatment for both these diseases as the drug reaches to the site of action quickly providing quick onset of action with lesser systemic side effects. Mainly devices like pressurised meter dose inhalers (pMDIs), breath actuated pMDIs, dry powder inhalers like rotahalor.[2] These techniques provide very quick and prompt relief in these diseases but require the good knowledge of their using techniques, because of incorrect and improper techniques results in poor control of disease. Hence, both the inhaler device and its technique are equally important to manage the disease. Rotahalor is a device which uses dry powdered inhalation technique i.e. breath actuated and remain unaffected by hand lung coordination, therefore is one of the most commonly used inhalation techniques. However it has some drawbacks like, it requires inspiratory flow of more than 30L/min in patients which is quite difficult to achieve.[3] Inappropriate techniques

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with it also leads to insufficient drug delivery and therefore insufficient lung deposition.[4] Thus, effective rotahalor using techniques (RUT) can improve the outcome of the management and this can be achieved by effective teaching, counseling and education of the patients as per the standard guidelines on regular and long term basis. It has been proved from various studies that pulmonary function tests can be used to measure the effect of disease to screen individuals having pulmonary diseases like bronchial asthma & COPD to assess prognosis and therapeutic interventions for proper monitoring. Especially Forced Expired Volume in one second ($FEV_1$) is most useful parameter in this aspect which measures air that person can forcibly blow out in one second and measured in liters. It is a measure of the amount of the air the lungs hold. The FEV1 calculates how easily air flows through the lungs. COPD patients have narrowing or inflammation of the airways and this leads to decrease in the $FEV_1$.[5]Therefore, this study is planned to assess the technique of rotahalor use in asthma and COPD patients visiting TB chest OPD and impact of intervention in reducing the common errors in technique to ensure maximum clinical benefit to them.

## 2. Methods and Materials

This was institution based prospective descriptive interventional study carried out in the asthma and COPD patients visiting TB Chest OPD of rural tertiary care teaching hospital of Maharashtra, for 4 months (September 2018 to December 2018) after approval from institution based Ethics committee.

Patients having age 18 years and more of either sex with the clinical diagnosis of bronchial asthma and COPD who were already using rotahalor for the period of more than one month duration consenting were included in the study. There were rigid exclusion criteria like patients using other inhalation technique than rotahalor, age less than 18 years, patients in the phase of exacerbation of bronchial asthma and COPD, patients with other co morbid conditions like tuberculosis, diabetes mellitus and hypertension, patients with other respiratory diseases than bronchial asthma and COPD, patients with terminal illness, pregnant and lactating mothers and patients who were not willing to participate in the study.

Patients meeting with the inclusion criteria and giving written consent were enrolled for the study. Patient profile form was designed to collect relevant personal and socio-demographical variables including occupation, educational status etc. Initially baseline forced expired volume in one second ($FEV_1$) was measured at OPD by peak flow meter. Next, the RUT was assessed using standardized inhaler specific check list adopted from Cipla leaflet and was modified as ten- point scale as per the checklist mentioned in Dutch Asthma Foundation.[6]The rotahalor manufactured by Cipla Ltd. pharmaceuticals was used for the study as it is commonly used in this hospital set up.

Patients were asked to perform RUT in front of researcher and were assessed on ten- point scale. Each correct step was given one point and each wrong or missed step was scored as zero. These were considered as pre-interventional scores. After this, patient was given physical demonstration of correct RUT along with verbal counseling by the researcher. This was followed by video demonstration of correct RUT. Queries from patient side were solved till the patient became perfectly aware of correct procedure. Along with this, the information sheet explaining all the related material in local language was provided to them. After one week, the same procedures were repeated using the same protocol and post-interventional scores were noted along with $FEV_1$ measurement. After collecting the data, it was checked for accuracy and completeness.

## 3. Results

Total 44 (COPD: 32 & asthma: 12) patients were enrolled in the study. Pre-interventional and post- interventional scores of RUT as well as $FEV_1$ values were compared using paired "t" test and statistical significance was calculated. Data was analyzed using Statistical Package for Social Sciences (SPSS) version 21. Out of 44 patients 24 were new users while 20 had previous exposure of using rotahalor. Before intervention none out of 44 could perform all the steps correctly, but after intervention almost 54.54% patient scored all the steps correctly. The mean pre-intervention score was 4.47 and mean post interventio n score was 9.36($p<0.001$) [Table 1]

Similarly, Mean FEV1 before intervention was 349 and after intervention was 418 ($p<0.001$) Table 2

## 4. Discussion

Rotahalor is the most commonly used inhaler globally as it is cheaper and easily handled by the patients. In our study, before actual intervention none of the study participant was able to do all the steps correctly but there is tremendous improvement after actual interventions. This finding is very much consistent with findings of previous studies. There are lots of studies available which propose the positive effect of educational intervention techniques in this regards.[7–10]

To assess the actual subjective effects in this regard, forced Expired Volume in one second ($FEV_1$) can be used as one of the useful parameter. It is a measure of the amount of the air the lungs hold which calculates how easily air flows through the lungs. COPD patients have narrowing or inflammation of the airways and this leads to decrease in the $FEV_1$.[5] From the results of our study it was clearly evident that there is positive change in the pre and post interventional scores of $FEV_1$ values.

**Table 1:** Pre and post intervention score comparison

| Interventional score | Mean | SD | t statistics | P value |
|---|---|---|---|---|
| Pre | 4.47 | 1.1511 | 26.47 | 0.00 |
| Post | 9.36 | 0.7803 | | |

**Table 2:** Pre and Post FEV1 Score comparison

| FEV1 | Mean | SD | t statistics | P value |
|---|---|---|---|---|
| Pre | 349 | 99.85 | 10.08 | 0.00 |
| Post | 418 | 111.16 | | |

Pre and post interventional improvement in RUT and $FEV_1$ values clearly suggest that, incorrect techniques play huge role in the treatment benefits in the diseases like bronchial asthma and COPD. This suggests the importance of repeated training and demonstration to improve the rotahalor use technique in these patients. This should also be supported with regular assessment of their technique and feedback, which will also ensure compliance and adequate delivery of drugs.

## 5. Conclusion

Asthma and COPD patients still don't use rotahalor inhalational technique correctly which therefore doesn't provide maximal benefits of therapy. Thus, proper counselling and training should be given to the patient as it may improve quality of their life

## 6. Source of funding

None.

## 7. Conflict of interest

None.

## 8. Acknowledgement

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