IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals
ISSN 2349-7203
HUMAN

Human Journals
**Research Article**
April 2024 Vol.:30, Issue:4


# Evaluation of Inhalation Technique among Asthma and COPD Patients in Tertiary Care Hospital, Kathmandu

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**Submitted:** 20 March 2024
**Accepted:** 27 March 2024
**Published:** 30 April 2024


**ijppr.humanjournals.com**

**Keywords:** Asthma, COPD, MDI, rotahaler.

**ABSTRACT**

**Background:** Pulmonary problems are major health problem in the world and are also increasing problem in developing countries. Asthma and COPD are major pulmonary problems. Asthma is a chronic inflammation characterized by the heterogeneous disease. COPD is an irreversible pulmonary disease. These pulmonary problems are mostly treated by inhalation medication. **Objective:** The main objective of our study was to evaluate inhalation technique among Asthma and COPD patient in tertiary care hospital, Kathmandu. **Materials and methods:** The study was cross sectional observational study. A total 178 patients were taken in the tudy. Questionnaires were asked based on questionnaires prepared on the basis of standard checklist. The result were entered in MS Excel, demographic distribution and Chi-square test was evaluated in SPSS version 14. **Results and Discussion:** A total of 178 patients were analyzed in our study, majority participants were female (55.06%). Most of the people used rotahaler (69.1%) rather than Metered Dose Inhaler (MDI) and 62.35% patients used inhalation device incorrectly. The main reason for incorrect use by patients was they hold medicine in mouth for less than 10 seconds after inhalation. There was significant association seen in rotahaler use technique with age and history of smoking. **Conclusion:** Hence, proper training to use rotahaler and MDI among asthma and COPD patient is required for desired outcomes.

## INTRODUCTION

Asthma is a chronic airway inflammation characterised by the heterogeneous disease. It can be treated mainly with inhaled medications in several forms [(1)]. COPD is an irreversible pulmonary disease in which airflow restriction due to the abnormalities in the airways and alveoli. In Nepal, COPD prevalence ranges from 23-43% and is in increasing trend [(2)]. Inhalation technique is most commonly used technique for improved drug delivery to asthma and COPD patients. There are different inhalation machines like Pressurized metered dose inhaler (pMDI), Rota haler, Burbo inhalers, disk inhalers, among them most of the widely used inhaler is MDI[(3)]. Proper use of the inhalers has direct impact on how well they work to provide their intended effect. When inhalation technique is poor, the drug donot reach the site of the action [(4)].

Inhalation therapy is the most important route for administering drugs in the treatment of asthma and COPD due to its quick onset of action, greatly enhanced safety profile and better efficacy than the oral route. Still, many asthma and COPD patients still continue to use oral medications [(5,6)]. Turbuhaler and disk inhaler are the inhaler that are most frequently used correctly rather than MDI [(7).] Thus, this study aims to evaluate inhalation technique among asthma and COPD patient in tertiary care hospital, Kathmandu.

## MATERIALS AND METHODS

A prospective cross-sectional study was conducted at Civil service hospital, Minbhawan, Kathamandu, Nepal for a period of six months. A total of 178 patients with asthma and COPD visiting OPD were participated in the study. All individuals aged 20 years and above were taken for the study. Patients who were prescribed MDI and Dry Powder Inhalers (DPI), and willing to respond to the questionnaire, were eligible. The exclusion criteria encompassed individuals not utilizing inhaler medications or those who refuse to participate in the study. The selection of participants was accomplished through a simple random sampling method. Data collection was executed using a self-designed performance, capturing pertinent information like age, gender, occupation, diagnosis and the specific inhalation therapy prescribed.

The research protocol received approval from Civil service hospital, Institutional Review Committee (IRC No. 11/2023) and authorization was granted by the hospital authority prior

to the commencement of the study. Written consent form was taken from patient for the study. The data were entered in MS Excel and compiled, managed, analyzed and presented using Statistical package for social sciences (SPSS) software version 14 were used. Pearson's chi-square test were be used to determine association of demographic factor to inhalation technique steps.

## RESULTS AND DISCUSSION

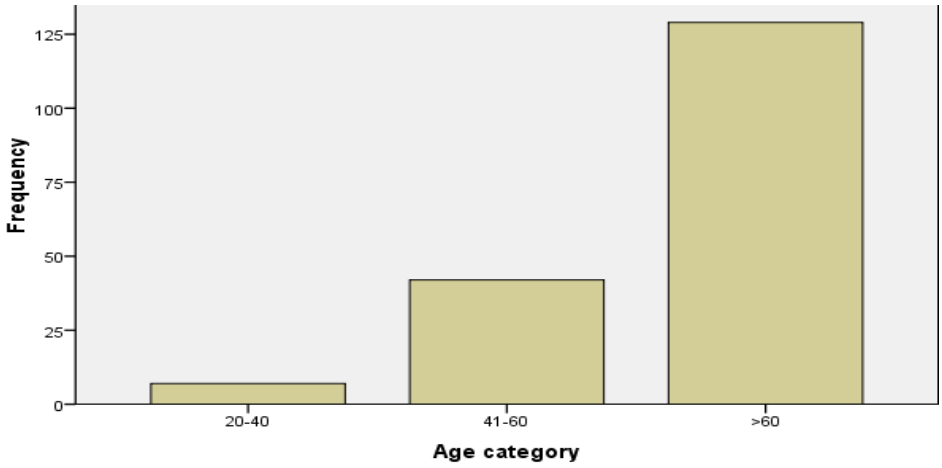


**Figure No. 1: Age category**

Figure 1 showed the age category characteristic of the participants where the number of patients between age group of >60 (72.5%) was found to be the highest and patients between age group of 20-40 was lowest (3.9%). The mean age of participant was 64.71 years.

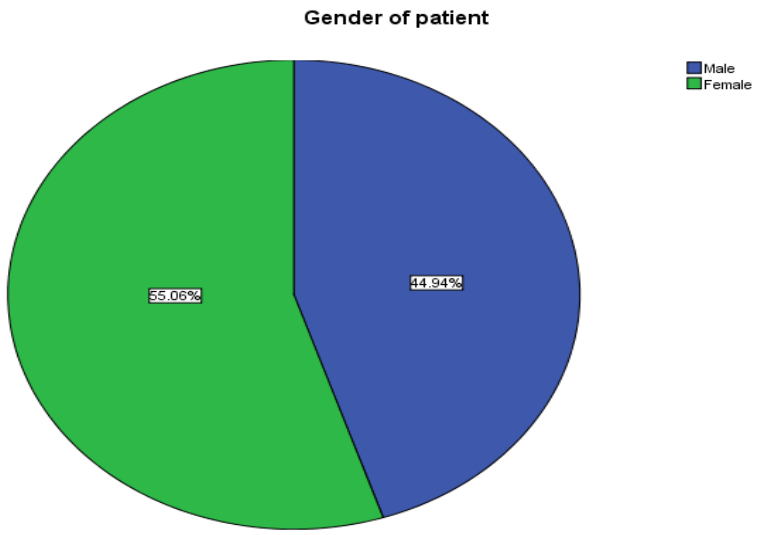


**Figure No. 2: Gender of patient**

Figure 2 showed that it was found that majority participants were female (55.06%) and rest were male (44.94%).

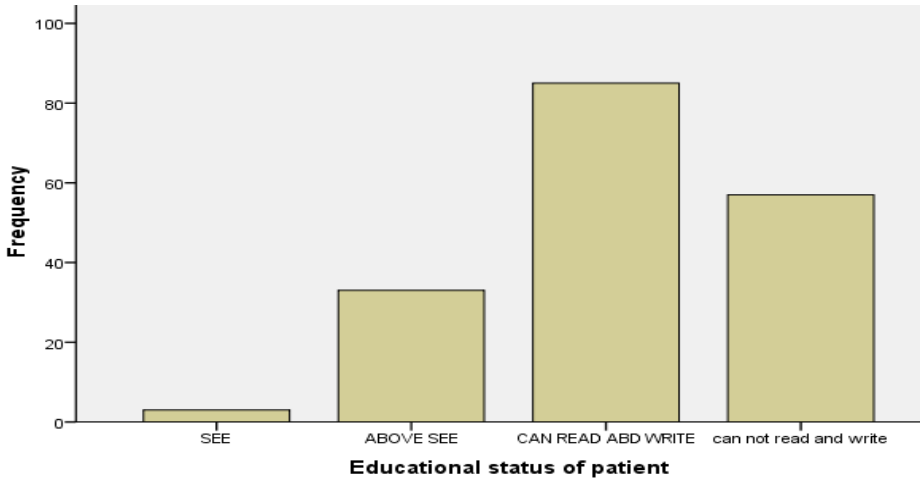


**Figure No. 3: Educational status of patient**

Figure 3 showed the educational level of the participants where 80 (44.9%) were 47.8% can read and write, 1.7% do SEE, 18.5% do above SEE and 32% cannot read and write.

**Table No. 1: Socio-demographic Characteristics**

| Socio demographic factor | Frequency | Percentage |
|---|---|---|
| Device Used | | |
| MDI | 55 | 30.9% |
| Rotahaler | 123 | 69.1% |
| History of smoking | | |
| No | 146 | 83.4% |
| If no | | |
| Never used | 41 | 27.7% |
| Left 2 years ago | 17 | 9.6% |
| Left 5 years ago | 90 | 50.6% |
| Yes | 32 | 17.97% |
| If yes | | |
| From 1-2 years | 5 | 2.8% |
| From 3-5 years | 4 | 2.2% |
| More than 5 years | 18 | 10.1% |

Table 1 showed majority of the patient used rotahaler (69.1%) and regarding the smoking habit of the patients, it was that found that 50.6% patients left smoke more than 5 years 50.6%.

**Table No. 2: Assessment of Dry Powder Inhaler (Rota haler)**

| Steps of rotahaler device | Correct Frequency (Percentage) | Incorrect Frequency (Percentage) |
|---|---|---|
| Do you Open the device? | 122(68.5%) | |
| Do you Side the lever away until it clicks? | 121(67.9%) | 1 (0.6%) |
| Do you insert rotacap with transparent end down? | 117(65.7%) | 5 (2.8%) |
| Do you rotate both ends to open the capsule? | 122(86.5%) | |
| Do you Exhale deeply, away from the mouthpiece? | 104(58.4%) | 18 (10.1%) |
| Do you Put your mouthpiece between teeth and close lip around? | 122(68.5%) | |
| Do you inhale deeply and forcefully? | 117(65.7%) | 5 (2.8%) |
| Do you remove rota haler from the mouth without exhaling into it? | 93(52.2%) | 29 (16.3%) |
| Do you hold breath for 10 seconds? | 50(28.1%) | 72 (40.4%) |
| Do you Breath out slowly? | 81(45.5%) | 41 (23%) |
| Do you wash machine? | 102(57.3%) | 20 (11.2%) |
| Do you wash mouth after use? | 100(56.2%) | 22 (12.4%) |

Table No. 3 showed assessment of rotahaler use in which the common mistake done by the patient was they forget to hold breathe for 10 seconds (40.4%) and followed by breathe out slowly (23%). Most of the patient rotate both end to capsule in with way 86.5% and inhale deeply and forcefully 65.7%.

**Table No. 3: Association of Demographic characteristics with Rotahaler use**

| Patient characteristics | Rotahaler (%) | P-value | Remarks |
|---|---|---|---|
| Age category | | | |
| 20-40 | 4(3.3%) | | |
| 41-60 | 25(20.5%) | 0.028 | S |
| >60 | 93(76.2%) | | |
| Gender | | | |
| Male | 51(41.8%) | 0.649 | NS |
| Female | 71(58.2%) | | |
| Educational level | | | |
| SEE | 2(1.6%) | | |
| Above SEE | 21(17.2%) | | |
| Can read and write | 63(51.6%) | 0.068 | NS |
| Cannot read and write | 36(29.5%) | | |
| Occupation | | | |
| Farmer | 54(44.3%) | | |
| House wife | 31(25.4%) | | |
| Retired officer | 21(17.2%) | 0.654 | NS |
| Teacher | 7(5.7%) | | |
| Firm | 1(0.8%) | | |
| Other | 8(6.5%) | | |
| Association of co-variant | | | |
| Yes | 50(40.9%) | | |
| No | 72(59.1%) | 0.453 | NS |
| History of smoking | | | |
| Yes | 97(79.5%) | 00.019 | 0S |
| No | 25(20.5%) | | |

* $p < 0.05$ statistically significant values, NS-non Significant, S- Significant

Table No. 3 showed that there was no significant association between rotahaler technique with gender, educational level, occupation and co-variant. However, significant association was seen in rotahaler technique with age and history of smoking.

People suffering from asthma and COPD are increasing nowadays and it is become a very common cause of death in near future[7]. In our study, Asthma and COPD was most commonly prevalent in geriatric patients with age group above 60 years (72.5%) and the mean age is 64.71%. Similarly, according to Jalpa Suthar et al. the prevalence of COPD and asthma occurs with increasing the age and most of patients were more than 60 years [8,9]. Out of 178 patients, more than half of the patient were female (55.1%). Similarly, according to T.B Adhikari et al, 54% female patients were suffering from Asthma and COPD[10].

Rotahaler (69.1%) were most commonly used rather than MDI (30.9%). The common mistake done by the patient was they forget to hold breath 10 seconds (40.4%) and followed by breath out slowly (23%) in rotahaler and in MDI. In our study, 62.35% patients used inhalation device incorrectly whereas Sudeep Shrestha et al. showed that 88.6% patients of COPD and asthma used the Rotaler Device incorrectly [5]. Shrinath et al. showed that an improper technique of rotahaler and MDI can lead to decrease the deposition of drugs in the lungs and can caused the uncontrolled Asthma and COPD. So it is necessary to identify the asthmatic and COPD patient with uncontrolled symptoms and check for adherence inhalation therapy and technique[11].

Educated people can understand better than uneducated people. Thus education plays the vital role in understanding inhalation technique. In our study 20.2% patient were educated and had shown the poor understanding and do incorrect technique. In contrast Mathew Joseph et al, suggested that most of the patient were educated to 28% high school level, followed by 26% higher secondary, 18% degree, 12% primary, 10 % post-graduation and only 6% were illiterate[12,13]. Effective training for correct use of inhaler by physician, nurse and pharmacist can increase drug compliance among asthma and COPD patients [14,15]. Education given to the healthcare professional can significantly improve the inhalation technique.

## CONCLUSION

It was found that most of the patients used inhalation device incorrectly that lead to decrease in efficacy, insufficient drug delivery, increase side effect and economic burden with non-compliance. Hence, training on use of rotahaler and MDI among asthma and COPD patient is required.

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