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Research Article

# ASSESSMENT OF THE KNOWLEDGE OF USAGE OF INHALERS AMONG HEALTH-CARE PROFESSIONAL STUDENT COMMUNITY

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**ABSTRACT**

**Objective:** Incorrect usage of inhaler devices might have a significant influence on the clinical effectiveness of the drug delivered. This issue is poorly addressed; hence, the study was designed to investigate the knowledge and ability of the health-care professional student community to use inhaling devices.

**Methods:** A questionnaire was constructed and piloted before carrying out the study. The health-care professional students were taken as the sample. The data obtained from the result of the survey were subjected to proper statistical analysis using SPSS software, and a statistical significance level of 0.05 was considered.

**Results:** Analysis of the data obtained from the study reveals that a significant difference was observed between the proper usage of the inhaling device and how the health-care professional student community executed the steps in its use. Their knowledge of cleaning pressurized metered-dose inhalers, storage, and the use of pictograms in patient counseling were also not well established.

**Conclusion:** Inefficient usage of inhalers may lead to insufficient drug delivery and hence to insufficient lung deposition. Regular reinforcement and assessment of correct inhalation technique for health professionals and caregivers are an essential component of successful asthma management. Therefore, appropriate and continuous educational programs enhancing health professionals' ability and knowledge of using inhaled devices are highly recommended for giving of proper inhalation technique, thus ensuring more successful drug delivery.

**Keywords:** Chronic obstructive pulmonary disease, Inhaler devices, Pressurized metered-dose inhalers, Inhalation technique, Asthma.

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## INTRODUCTION

The inhalation route of drug delivery allows smaller doses to be used, offers a more rapid onset of action, and has a better safety-to-efficacy ratio compared to systemic therapy as therapeutic agents enter directly to the lungs. Administration of aerosolized drugs is most commonly performed using delivery devices such as pressurized metered-dose inhalers (pMDIs) and dry-powder inhalers (DPIs). Extensive research is going on various pulmonary drug delivery systems like DPI of controlled release products, micro/nanomedicines, and liposomes for the treatment of life-threatening disorders [1].

The preferred route of drug delivery for chronic obstructive pulmonary disease (COPD) and anti-asthma drugs is by inhalation. In a developing country like India, acute exacerbation of COPD cases is a major cause of health-care utilization and hospital admission [2]. The asthma-related costs and morbidity are high despite the advanced treatment and management guidelines; this may be ascribed to various factors including the inappropriate inhalation technique [3]. Taking into consideration the predicted increase in mortality and morbidity due to COPD, the cost of treatment will cause a substantial economic burden in a populous country like India. The formulation of a strategy to tackle these imminent crises is of vital importance [4]. It has been revealed by surveys and studies that metered-dose inhalers and PMDIs are frequently misused and that their improper usage by health-care personnel has led to the intricacy of using the device by patients which results in therapy failure [5-8]. The pMDI is still the most commonly prescribed inhaler device worldwide even though most patients are not skilled enough to use it correctly [9-15]. This may be attributed to the fact that pMDIs require good coordination of patient inspiration and inhaler activation to ensure proper inhalation and deposition of drug in the lung [15]. The results of studies and surveys also indicated that the counseling provided by the health-care professionals brought good compliance in patients with COPD in terms of the knowledge, attitude, and practice; these factors significantly influenced the therapeutic outcome [16,17].

It is patient's right to be educated correctly in the self-administration of inhaled medication, and for this, it is imperative that the health-care professionals who have a role in patient education are confident and have a grasp of the correct technique [18]. This issue is poorly addressed, and hence, this study was designed to investigate the knowledge and ability of the health-care professional student community to use inhaling devices.

## METHODS

The study was conducted at Sharada hostel, Indira hostel, and in Acharya Compound of Manipal University, Manipal. Health-care professionals' students in their final year or internship who consented to participate in the study were included in the investigation. A total of 100 students (79 females and 21 males) participated in the study. The participants were students from various courses in which the majority of students were from MBBS (39%) followed by the pharmacy (35%), nursing (23%), and physiotherapy (3%). Non-health-care professional students were excluded. A cross-sectional design was applied for the study.

A questionnaire was constructed based on appropriate studies and piloted to be used as a tool for this study. It included general information such as the use of inhalers by health-care professional student in their

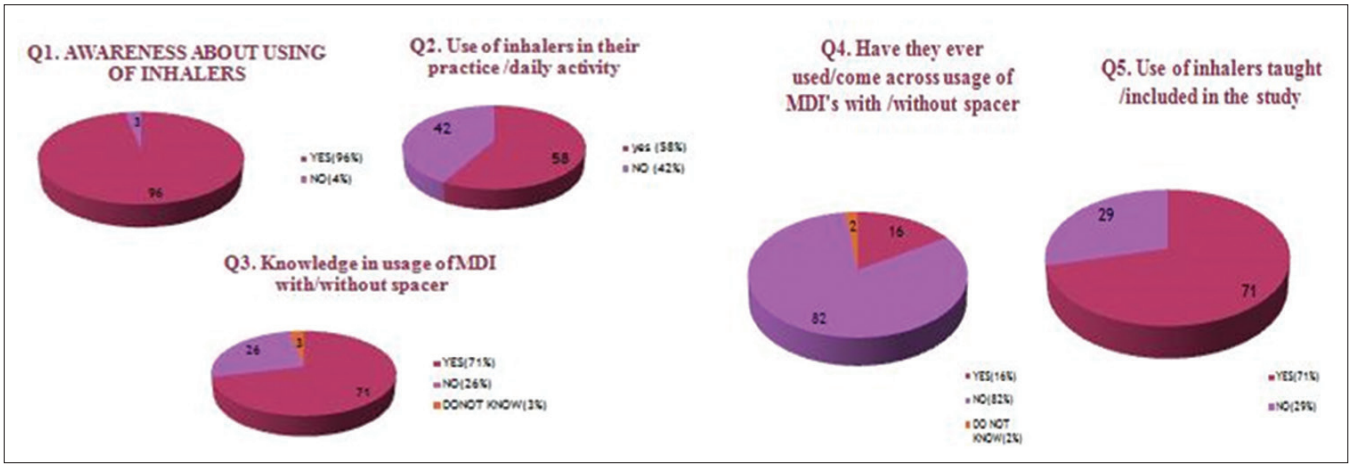


**Fig.1: Participants' response to queries**

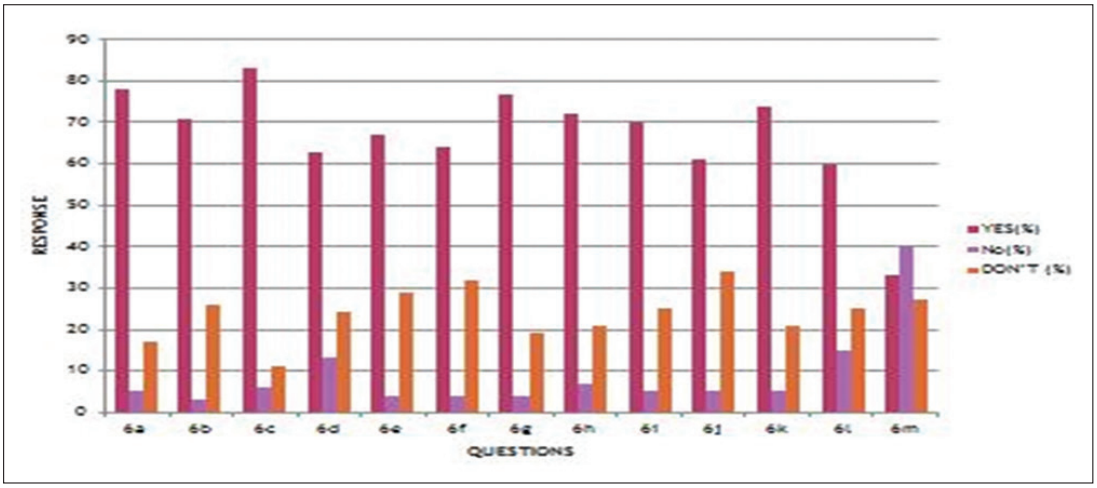


**Fig. 2: Participants' knowledge on steps in the usage of the inhaler**

practice/day activity in asthma/COPD wards, their knowledge about usage of metered-dose inhalers with or without spacer, if the use of inhalers was included/taught in their academic/practice study, their advice for asthmatic patients regarding the proper use of inhaled medications, and if they liked to have pictorial representation on demonstration of inhaler usage to teach the patients. The questionnaire also contained queries regarding the health-care professionals' knowledge regarding the usage (Table 1), storage, and cleaning of different types of inhalers.

The questionnaire was given to the participants and asked to return the same after filling it. The data obtained from the result of the survey were subjected for suitable statistical analysis (Descriptive statistics, SPSS software 16th version)

**Table 1: Questions related to participants knowledge on steps in the usage of the inhaler**

| S. No | Questions |
|---|---|
| 6a | Shake the inhaler well before use |
| 6b | Remove the cap of inhaler and spacer while using |
| 6c | Connect spacer with the inhaler |
| 6d | Put mouthpiece between teeth without biting and close the lips |
| 6e | Breathe out gently before taking inhalation |
| 6f | Hold spacer and press down canister |
| 6g | Breathe in slowly and deeply then hold breath for 10 s |
| 6h | Remove spacer from the mouth |
| 6i | Breathe out gently |
| 6j | Remove the inhaler from the spacer |
| 6k | If an extra dose is needed wait for 1 min |
| 6l | Replace cap and disassemble spacer |
| 6m | Gargle mouth with the spacer |

## RESULTS

The results indicate that 96 % of students were aware of the usage of inhalers. 71 % of the health care professional students are aware of the usage of metered dose inhalers with or without spacers and that 71 % of students in their academics were taught about the usage of the inhaler (Figs. 1 2). Only 80% were aware of washing the inhaler (spacer) after use, and most of them replied that the use of pictograms was very much useful for correct usage, for better understanding and also for increasing the compliance (Fig. 3).

## DISCUSSION

Petite studies have been conducted for the evaluation of health-care professional's student's knowledge and ability to use different inhaled medications in India. No matter how efficacies the medicines in the inhalation device may be, poor inhalation technique may cause it to be ineffective [19]. The health-care team must train their patients for the correct use of inhaled medications. Therefore, they should be able to practice the different inhalation techniques accurately to educate their patients correctly. As the concept of pharmaceutical care is evolving, the health-care professional should recognize the ethical responsibilities toward their patients. Proper patient counseling and education of their medicines is one of them. The present study identified some issues

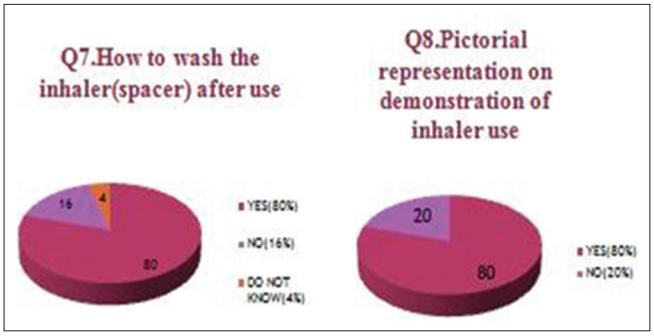


**Fig.3: Participants' response to washing of inhaler and use of pictorial representation**

where the participants are found to be less knowledgeable; hence, health-care professional's team should offer some crucial tips through patient education and counseling sessions. Examples of these tips are the correct ways to operate an inhaler, the ideal storage conditions, washing, and drying of pMDIs. Participating professionals strongly favour demonstrating inhalers use to patients via pictograms and model devices. In addition, it has been establishing by a study that awareness about the inhaler technique may further decline if not reviewed on a routine basis [20]. The health-care providers who are responsible for instructing patients on the correct technique are unable to perform the procedure correctly themselves, indicating the need for regular formal training in academics as well as in clinical practice.

## CONCLUSION

Incorrect inhalation technique is common among asthma/COPD patients. This study reveals that therapeutic failure is due to lack of exposure to this type of instrument usage among health-care professional students to demonstrate the technique correctly. It strongly suggests that education of health-care professional students in inhalation techniques is essential for the therapeutic success of any asthma/COPD.

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## CONFLICTS OF INTEREST

Declared None.

## REFERENCES

1. Ruckmani K, Chandrasekaran K. Sustained release aerosol for pulmonary drug delivery system: A review. Int J Pharm Pharm Sci 2013;5:126-30. Available from: http://www.ijppsjournal.com/Vol5Issue3/7211.pdf.
2. Saikat B, Suranjan M, Amalesh S. Epidemiological study of bacterial microbiology in AECOPD patients of Kolkata, India. Asian J Pharm Clin Res 2012;6:112-6. Available from: http://www.ajpcr.com/Vol6Issue1/1499.pdf.
3. Giraud V, Roche N. Misuse of corticosteroid metered-dose inhaler is associated with decreased asthma stability. Eur Respir J 2002;19:246-51.
4. Sajesh KV, Salmiah MA, Kingston R, Suresh KB. Cost of acute exacerbation of COPD in patients attending government hospital in Kerala, India. Int J Pharm Pharm Sci 2012;4:659-61. Available from: http://www.ijppsjournal.com/Vol4Issue3/4222.pdf.
5. Chinet T, Huchon G. Misuse of pressurized metered dose aerosols in the treatment of bronchial diseases: Incidence and clinical consequences. Ann Med Interne 1994;145:119-24.
6. Hanania NA, Wittman R, Kesten S, Chapman KR. Medical personnel's knowledge of and ability to use inhaling devices. Metered-dose inhalers, spacing chambers, and breath-actuated dry powder inhalers. Chest 1994;105:111-6.
7. Newman SP. Aerosol deposition considerations in inhalation therapy. Chest 1985;88:152S-160S.
8. Hilman B. Aerosol deposition and delivery of therapeutic aerosols. J Asthma 1991;28:239-42.
9. Crompton GK. Problems patients have using pressurized aerosol inhalers. Eur J Respir Dis Suppl 1982;119:101-4.
10. Crompton G, Duncan J. Clinical assessment of a new breath-actuated inhaler. Practitioner 1989;233:268-9.
11. Crompton GK, Dewar MH, Allbut HM, Innes JA. Inhaler preference and technique in inhaler native subjects; A comparison of HFA and conventional devices. Thorax 2000;55 Suppl 3:A61.
12. Gayrard P, Orehek J. Inadequate use of pressurized aerosols by asthmatic patients [author's transl]. Respiration 1980;40:47-52.
13. Lenney J, Innes JA, Crompton GK. Inappropriate inhaler use: Assessment of use and patient preference of seven inhalation devices. EDICI. Respir Med 2000;94:496-500.
14. Plaza V, Sanchis J. Medical personnel and patient skill in the use of metered dose inhalers: A multicentric study. CESEA group. Respiration 1998;65:195-8.
15. Sprossmann A, Kutschka F, Enk M, Bergmann KC. [Factors affecting correct use of metered dose aerosols]. Z Erkr Atmungsorgane 1991;177:93-5.
16. Mohammed SS, Alhas JJ, Siraj S. Study on the impact of patient counseling on the quality of life and pulmonary function of asthmatic patient. Int J Pharm Pharm Sci 2012;4 Suppl 5:300-4. Available from: http://www.ijppsjournal.com/Vol4Suppl5/5038.pdf.
17. Thomas R, Ramesh A, Thomas S. Impact of clinical pharmacist intervention on knowledge, attitude and practice (KAP) of patients with chronic obstructive pulmonary disease. Int J Pharm Pharm Sci 2010;2:54-7. Available from: https://innovareacademics.in/journal/ijpps/Vol2Issue4/574.pdf
18. Steven MD, Kevin Z, Kenneth R, Chapman MD. Pharmacist knowledge and ability to use inhaled medication delivery systems. Chest 1993;104:1737-42.
19. Lindgren S, Bake B, Larsson S. Clinical consequences of inadequate inhalation technique in asthma therapy. Eur J Respir Dis 1987;70:93-8.
20. Skaer TL, Wilson CB, Sclar DA, Arnold TA, Garcia CF, Schmidt LN, *et al.* Metered-dose inhaler technique and quality of life with airways disease: Assessing the value of the vitalograph in educational intervention. J Int Med Res 1996;24:369-75.