

Who will teach the teachers: An analysis of the inhaler technique of Indian patients and health care providers in a tertiary health care centre

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ABSTRACT

Introduction: The proper use of inhalers is essential for ensuring proper control of the disease. Various studies have shown high levels of improper use and lack of knowledge of the correct technique among patients with asthma. However, less data are available on how health care workers (HCW's) use inhalers. **Materials and Methods:** The study was conducted at a Tertiary Care Hospital in Mumbai. We evaluated the pMDI technique in 141 consecutive adult asthmatics and 100 HCW's. All patients and HCW's were graded out of 10 points for following 10 steps. These were derived from Melani et al.'s study on inhaler mishandling. **Results:** Techniques of 141 patients and 100 HCW's (55 nurses and 45 doctors) were analyzed. The average technique score among patients ranged from 0 to 10 with a mean of 4.65 ± 2.00 . The combined score for health workers ranged from 3 to 9 with a mean of 5.45 ± 1.47 . Doctors had a higher score of 6.35 ± 1.33 as opposed to the nurses' score of 4.70 ± 1.13 ($P < 0.05$). There was no significant difference between scores of nurses and patients ($P > 0.05$). **Conclusions:** Our study highlights the need for better education of not only patients but also health care providers regarding the appropriate use of inhaler devices in order to achieve optimal control of obstructive airway diseases.

KEY WORDS: Health care workers, inhaler technique, patients

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INTRODUCTION

The treatment of asthma has been revolutionized with the use of inhaled bronchodilators and corticosteroids. However, the proper use of inhalers is essential for ensuring proper control of the disease. Various studies have shown high levels of improper use and lack of knowledge of the correct technique among patients with asthma.^[1,2] These studies have also shown that patient outcomes are related to correct inhaler techniques.^[1,3]

There have been studies from the west as well as various parts of Asia and a few from India. However, less data are available on how health care workers (HCW's) use inhalers. As it is, the HCW who will eventually teach the patients the correct use of inhalers, it is important to know whether they themselves have adequate knowledge of the same. In the present study, we evaluated the pressurized metered dose inhaler (pMDI) technique of adult patients

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How to cite this article: Mullerpattan JB, Udwadia ZZ, Kathar SS, Shah HD, Rastogi SA, Pandey KV, et al. Who will teach the teachers: An analysis of the inhaler technique of Indian patients and health care providers in a tertiary health care centre. Lung India 2016;33:493-5.

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| Quick Response Code:  | Website: www.lungindia.com |
| | DOI: 10.4103/0970-2113.188962 |

with asthma as well as their HCW's (doctors and nurse) in the hospital.

MATERIALS AND METHODS

The study was conducted at a tertiary care hospital in Mumbai with an active Department of Pulmonology. Ethical clearance was obtained from the Institutional Review Board.

We evaluated the pMDI technique in 141 consecutive adult asthmatics and 100 HCW's.

Inclusion criteria included adult patients of asthma (age >18 years), using pMDI's, consenting to be part of the study.

Exclusion criteria included patients <18 years of age, using inhalers other than pMDI's, and those not consenting to be part of the study.

The age, educational status, gender, and duration of illness were recorded in a proforma. Similarly, the age and gender of HCW's was also noted. All patients and HCW's were graded out of 10 points for following 10 steps [Table 1]. These were derived from Melani *et al.*'s study on inhaler mishandling.^[1]

Statistical analysis

The mean and standard deviation was calculated for quantitative variables. The educational status was classified into (1) under class 5; (2) up to class 12; (3) graduation and beyond. The technique score was correlated with age and duration of illness using the Spearman's rho coefficient and linear regression. The technique score of various educational strata was compared using nonparametric *t*-test. The average technique scores between various groups were compared using the nonparametric *t*-test. $P = 0.05$ was taken as significant.

RESULTS

Techniques of 141 patients and 100 HCW's (55 nurses and 45 doctors) were analyzed. Among 141 patients, there were 72 females and 69 males. Of the 55 nurses, there were 50 males and 5 females. Of the 45 doctors, 25 were males and 20 were females. The age of patients varied from 18 to 55 years with a mean of 34.07 ± 3.15 . The age of nurses varied from 23 to 40 years with a mean of 30.52 ± 2.75 . The age of doctors varied from 25 to 45 years with a mean of 32 ± 2.80 . Dividing the education status as described earlier, we had 20 patients below class 5, 50 patients between class 5 and 12, and 71 graduates. The technique score in the three groups was similar with mean of 4.60, 4.51, and 4.76, respectively ($P > 0.05$). The average technique score among patients ranged from 0 to 10 with a mean of 4.65 ± 2.00 [Table 2]. The combined score for health workers ranged from 3 to 9 with a mean of 5.45 ± 1.47 [Table 3]. Doctors had a higher score of 6.35 ± 1.33 as opposed to the nurses' score of 4.70 ± 1.13 ($P < 0.05$). There was no significant difference between scores of nurses and

Table 1: Steps for scoring of inhaler technique

| Step number | Description |
|-------------|--|
| 1 | Remove mouthpiece cap |
| 2 | Shake inhaler |
| 3 | Breathe out before firing |
| 4 | Inhaler upright during firing |
| 5 | One inhalation for actuation |
| 6 | Place mouthpiece between lips and over tongue |
| 7 | Actuation in the first half of inhalation |
| 8 | Fire while breathing in deeply and slowly and continue until total lung capacity |
| 9 | Inhalation by mouth |
| 10 | Hold breath for 10 s after inhalation |

Table 2: Score distribution for patients (n=141)

| Score | n (%) |
|------------|------------|
| 0 | 1 (0.7) |
| 1 | 3 (2.1) |
| 2 | 13 (9.21) |
| 3 | 31 (21.98) |
| 4 | 24 (17.02) |
| 5 | 23 (16.31) |
| 6 | 18 (12.76) |
| 7 | 16 (11.34) |
| 8 | 7 (4.96) |
| 9 | 3 (2.1) |
| 10 | 2 (1.4) |
| Mean score | 4.65±2.00 |

Table 3: Score distribution for health care workers (n=100)

| Score | n (%) |
|------------|-----------|
| 3 | 8 (8) |
| 4 | 17 (17) |
| 5 | 32 (32) |
| 6 | 22 (22) |
| 7 | 12 (12) |
| 8 | 4 (4) |
| 9 | 5 (5) |
| Mean score | 5.45±1.47 |

patients ($P > 0.05$). The most common errors in all three groups were: (1) Step 5: One inhalation for actuation. (2) Step 8: Fire while breathing in deeply and slowly and continue until total lung capacity and (3) Step 10: Hold breath for 10 s after inhalation in decreasing order.

Age, duration of illness, and educational status were not significant predictors of technique score in patients.

DISCUSSION

India has a large population of asthmatics with a prevalence of 2–2.5% translating to absolute numbers of 20–25 million.^[4] The use of inhaled medication forms a cornerstone of treatment of asthma. The correct use of inhalers is essential for optimal effect. Even with the best techniques, the amount of drug delivered to the lungs is about 15–20%.^[5]

The most expensive inhaler is the one that is used incorrectly. Various studies have demonstrated that a large proportion of asthmatics have an inefficient or poor inhaler

technique. The estimates vary from 20% to 90%.^[1-3,6,7] Such as earlier studies, our study also showed that the inhaler techniques were dependent on the number of times the patients had received instructions from HCW's regarding the same.^[8,9] The poor inhaler technique of asthmatics seems to be common in other studies from not only India but also other countries especially in the Indian subcontinent and South-East Asia.^[9-11] Studies have also shown that poor inhaler technique results in worsening disease control and quality of life.^[1,10]

Our study showed that 136/141 patients had a score of 8 or less out of 10. Only 2 out of 141 patients performed all 10 steps correctly. There was no significant difference based on age, gender or educational status. Thus, throughout the spectrum of adult asthmatics using pMDI's almost all had a significantly poor technique which could possibly lead to poor disease control. A few studies have shown worsening inhaler technique with increasing age, female gender, and low educational status.^[12,13] However, our study showed only a relationship with a number of times they had been instructed.

However, the patients can be appropriately instructed only if the health care providers themselves are well trained to do so. Our study showed that doctors and nurses also made multiple errors in using inhalers. Although the scores of doctors were significantly better as compared to nurses and patients, it was still quite inadequate compared to the total score (mean score for doctors - 6.35/10). The nurses, in fact, had almost as poor technique as the patients themselves (4.70 vs. 4.65). Thus, in a situation where nurses have an important responsibility towards patient education, it will not be surprising that the patients will have poor inhaler techniques. There have been few studies describing the inhaler technique among doctors and nurses.^[14] In a study from Gujarat involving medical interns, only 34% could properly use a pMDI.^[15] A study from Nepal showed that technique of MDIs among HCW's was poor and needed further education and training.^[16]

Our study highlights the need for better education of not only patients but also health care providers regarding the appropriate use of inhaler devices in order to achieve optimal control of obstructive airway diseases. We now make sure that the inhaler technique of every asthmatic is checked and reinforced at every follow-up visit. Furthermore, the HCW's are provided training regarding the same on a regular basis.

Our study had a few limitations. First, it involved only asthmatics and not patients with the chronic obstructive pulmonary disease. Second, there was no postintervention/education

group. Third, we checked the techniques of only pMDIs and not DPIs.

CONCLUSIONS

However, this study still shows that even at a tertiary care hospital, the inhaler techniques of patients, as well as HCW's, are quite poor, and there is a greater need of educating not only the patients but also their teachers.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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