



Brief Communication

Evaluation of inhaler technique among patients with asthma and COPD in Yemen

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Abstract

Objectives: This study aimed to evaluate metered-dose inhaler (MDI) technique among Yemeni patients with asthma and chronic obstructive pulmonary disease (COPD), and to investigate factors that affect correct use of MDIs.

Methods: A cross-sectional study was conducted in five pharmacies in the Yemeni capital city of Sana'a to evaluate MDI technique among adult patients with asthma and COPD and to investigate factors that influence proper application of MDI techniques.

Results: Of 49 patients, 47 (95.9%) were males and two (4.1%) were females. The mean age of the patients was 52.90 ± 6 years (range: 43–64 years). This study showed that only nine patients (18.4%) demonstrated good knowledge of MDI techniques; two patients (4.1%) demonstrated moderate knowledge; the majority of patients (77.6%) showed poor knowledge regarding correct MDI technique. Previous training regarding MDI technique was the only factor that affected appropriate use of MDIs.

Conclusion: The majority of patients in this study could not use their MDI appropriately. Thus, patients should be educated regarding correct MDI technique upon dispensing of inhaler medications. Training and

educational intervention programs may contribute to improved MDI technique among patients.

Keywords: Asthma; COPD; Inhaler techniques; Patients; Yemen

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Introduction

Inhaled medications are widely prescribed for patients with asthma and chronic obstructive pulmonary disease (COPD); these allow therapeutic agents to be delivered directly to the lungs and provide more rapid onset, greater efficacy, and fewer side effects.^{1,2} Patient inhalation technique is associated with clinical response: improper use of inhalers by patients leads to poor clinical outcomes.^{1,2} Metered-dose inhalers (MDIs) and dry-powder inhalers (DPIs) are the most common types of inhaler devices.^{1,2} Patient education and counselling regarding inhaler techniques are very important for the treatment of asthma and COPD.^{1,2} In Yemen, asthma and COPD are among the top 10 causes of morbidity and mortality.³ Patients in Yemen consider community pharmacies as the most accessible healthcare facilities; in these locations, there is an opportunity to counsel patients regarding their use of inhaled medications.⁴ Many studies about the suitability of MDIs have been conducted in Arabic countries,^{5–8} but little remains known regarding the ability of patients to use MDIs correctly. Therefore, the current study aims were to evaluate MDI techniques among patients with asthma and COPD in

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Yemen, and to investigate factors affecting correct use of MDIs.

Materials and Methods

Study design

A cross-sectional study was conducted between 1st March and 1st June 2016 in five pharmacies in Sana'a, Yemen. Training was provided to community pharmacy dispensers regarding different inhaler techniques and evaluation of adult patients' inhaler techniques.

Sample size

The sample size (n) was calculated based on this formula [$n = Z^2 P (1 - P)/d^2$] to estimate the number of subjects or patients required for this study, where n = sample size, Z = Z statistic for a level of confidence (Z = 1.96 is selected in many studies to provide robust power when estimating the sample size), and P = expected prevalence or proportion. The formula is based on the prevalence or incidence of related matter. In this equation, the prevalence is 10%, d = precision (for the level of confidence of 95% or 0.05), $n = (1.96)^2 \times 0.10 (1-0.5)/(0.05)^2 = 77$. Adult patients were invited to participate in this study when they entered the pharmacies to buy or ask about their inhaler medications.

Ethical considerations

This study was approved by the University of Science and Technology and by the managers of community pharmacies. Written consent was obtained from the pharmacy managers and the patients. Furthermore, no personal data was obtained regarding pharmacies, pharmacy dispensers, or patients.

Evaluation of patient knowledge regarding appropriate use of MDIs

The evaluation was performed by using a validated MDI evaluation checklist,^{3,7,8} as shown in Table 1.

A scoring system was used in this study, where each performed step was given a value of 1 and an unperformed or incorrect step was given a value of 0. Scores ≥ 7 with effective demonstration of critical steps were considered "good," scores 5 and 6 with effective demonstration of critical steps were considered "moderate," and scores ≤ 4 and any failure to demonstrate critical steps were considered "poor."

Statistical analysis

Data were recorded and analysed by using SPSS version 21 (SPSS Statistics for Windows, version 21.0, IBM Corp., Armonk, NY, USA). Differences in proportions were tested via the chi-squared test or Fisher's Exact test. Results were regarded as significant when P-values were ≤ 0.05 .

Results

A total of 159 patients presented at the pharmacies with a diagnosis of asthma or COPD; 49 of these patients met the

Table 1: Recommended Checklist of Metered-Dose Inhaler (MDI).^{3,4,8}

Step	Score
1 Shake the inhaler well. ^a	
2 Remove the dust cap. ^a	
3 Exhale slowly through pursed lips.	
4 If using the "closed-mouth" technique, hold the inhaler upright and place the mouthpiece between your lips. Be careful not to block the opening with your tongue or teeth. If using the "open-mouth" technique, open your mouth wide and hold the inhaler upright 1–2 inches from your mouth, making sure the inhaler is properly aimed.	
5 Press down on the inhaler once as you start a slow, deep inhalation. ^a	
6 Continue to inhale slowly and deeply through your mouth. Try to inhale for at least 5 s.	
7 Hold your breath for 10 s (use your fingers to count to 10 slowly). If 10 s makes you feel uncomfortable, try to hold your breath for at least 4 s.	
8 Exhale slowly.	
9 Wait at least 30–60 s before inhaling the next puff of medicine.	

^a Critical steps.

inclusion criteria and were accepted to participate in this study (all 49 patients agreed to participate). Thirty-one patients were diagnosed with COPD and 18 were diagnosed with asthma. All patients used salbutamol inhalers. Of 49 patients, 47 (95.9%) were males and two (4.1%) were females. The mean age of the respondents was 52.90 ± 6.86 years (range: 43–64 years). Table 2 shows appropriate MDI use among the patients in this study.

Table 2: Metered-Dose Inhaler (MDI) appropriate use.

Step	MDI N = 49 (100%)
1 Shake the inhaler well. ^a	29 (59.2)
2 Remove the dust cap. ^a	49 (100)
3 Exhale slowly through pursed lips.	19 (38.8)
4 If using the "closed-mouth" technique, hold the inhaler upright and place the mouthpiece between your lips. Be careful not to block the opening with your tongue or teeth. If using the "open-mouth" technique, open your mouth wide and hold the inhaler upright 1–2 inches from your mouth, making sure the inhaler is properly aimed.	13 (26.5)
5 Press down on the inhaler once as you start a slow, deep inhalation. ^a	11 (22.4)
6 Continue to inhale slowly and deeply through your mouth. Try to inhale for at least 5 s.	21 (42.9)
7 Hold your breath for 10 s (use your fingers to count to 10 slowly). If 10 s makes you feel uncomfortable, try to hold your breath for at least 4 s.	20 (40.2)
8 Exhale slowly.	16 (32.7)
9 Wait at least 30–60 s before inhaling the next puff of medicine.	18 (36.7)

^a Critical steps.

The findings of this study showed that only nine patients (18.4%) demonstrated good knowledge of MDI techniques; two patients (4.1%) demonstrated moderate knowledge; the majority of patients (77.6%) showed poor knowledge regarding correct MDI technique. This study showed that there was a significant difference (p -value = 0.000) between patients with and without previous training regarding proper MDI technique. All patients with previous training (18.4% of study patients) demonstrated good knowledge regarding appropriate MDI technique. The findings of this study showed that previous training regarding MDI technique was the only factor that affected appropriate use of MDIs.

Discussion

The majority of patients in this study could not use their MDIs correctly, and there was an association between training and correct use of MDIs. To improve patients' MDI skills, health care professionals should ensure patients are trained regarding correct use.^{1,2} The majority of patients in Yemen receive their medications and treatment from community pharmacies.^{3,4} Community pharmacists in Yemen can play an important role regarding improvement of patients' ability to use MDI correctly. The number of pharmacists working in Yemeni community pharmacies is <10%,^{3,4} which could explain the poor knowledge among patients regarding correct MDI use. Incorrect inhaler technique among patients affects achievement of treatment outcomes, which leads to increased admission to the emergency department, increasing the cost of illness and decreasing the quality of life.^{1,2} Training programs for community pharmacy dispensers and other health care professionals are potential keys for improving MDI technique among patients.¹ Counselling and education sessions provided by health care professionals will improve patients' abilities to use MDI correctly.

Conclusion

The majority of patients in this study could not use their inhalers appropriately. Patients should be educated regarding correct inhaler technique upon dispensing of inhaler medications. Training and educational intervention programs may contribute to the improvement of MDI technique among patients. This study was performed only in one city and with a small sample size; thus, we cannot generalize the results of this study.

Recommendations

Studies in other cities and with larger sample sizes are necessary. Training and educational intervention programs are highly recommended to improve MDI technique among patients.

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Conflict of interest

The author has no conflict of interest to declare.

Ethical approval

This study was approved by the University of Science and Technology and by the managers of community pharmacies. Written consent was obtained from the pharmacy managers and the patients.

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