

Use of simulated patient approach to assess the community pharmacists' knowledge of appropriate use of metered dose inhaler

Abstract

Rationale: The pharmacist charged with the responsibility of drug administration and counseling should have the basic knowledge and skills necessary to demonstrate the use of metered dose inhalers (MDIs) to asthma patients for the maximization of treatment outcomes.

Objective: This study was designed to evaluate the community pharmacists' knowledge of the appropriate use of MDIs in Anambra State, Nigeria.

Methods: The study was carried out in two major cities in Anambra State, Nigeria, using 41 registered community pharmacists. A simulated patient approach utilizing two adequately trained pharmacy students were used. Obtained data were analyzed using independent *t*-test and one-way ANOVA through SPSS version 18.

Results: The pharmacists had a mean demonstration score of 45.45%. Step number seven of the correct use of MDI, which involves breathing in and depressing the canister was the most demonstrated step (90.2%) while step 4 which involves tilting the head back slightly was the least demonstrated (14.6%) by the pharmacists. Among five identified critical steps in asthma guideline used, two were well demonstrated (75.6% and 90.2%): one averagely demonstrated (51.2%) and two poorly demonstrated (39% and 31.7%). Sociodemographic characteristics did not influence the demonstration ability of the pharmacists in this study.

Conclusion: The study indicated that community pharmacists lacked the adequate knowledge of appropriate use of MDI. Training programs for pharmacists focusing on the use of such devices will enable them to educate patients on the effective use of MDIs in patients with asthma.

Key words:

Asthma, community pharmacist, knowledge, metered dose inhalers

Introduction

About 235 million people across the world suffer from Asthma,^[1] with no fewer than 50 million Nigerians suffering from this disease.^[2] Asthma is defined as a chronic inflammatory condition characterized by airway hyperresponsiveness to multiplicity of stimuli^[3] with wheezing, dyspnea, and cough as the major clinical presentations. Achieving and maintaining asthma control requires four major components including assessment and monitoring, education of patients for a partnership in care, control of environmental factors, and comorbid conditions that affect asthma and pharmacotherapy.^[4]


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Pharmacotherapy is targeted at two main strategies, namely blocking the release of chemical mediators of bronchoconstriction and then, reversal of bronchoconstriction and other pathologic features of the disease.^[3] At present, many drugs including adrenergic stimulants, phosphodiesterase inhibitors, anticholinergic drugs, and corticosteroids are effective in the pharmacotherapy of the disease. These drugs are present in different dosage forms for different routes of administrations and could be used for oral, inhalational, or parenteral routes of administrations.

Inhalational is the preferred route of delivery for drugs used in the treatment of asthma^[5] due to the advantage of direct and localized delivery of a high concentration of the agents to the bronchioles with minimal side effects.^[6] A variety of inhaler devices is available including metered dose inhalers (MDIs) which are the most commonly prescribed and used dosage form.^[7,8] These inhalers deliver an aerosol of drug dissolved or suspended in a propellant directly to the lungs for their local actions. According to the National Asthma Council, Australia, incorrect technique when taking inhaled medications frequently prevents patients with asthma from receiving the maximal benefit from their medications.^[9] Studies also show that patients are unlikely to use inhalers correctly unless they receive clear instructions with physical demonstrations repeated over time.^[10] The use of correct inhaler technique has been shown to improve asthma control and asthma-related quality of life.^[9,11,12]

According to Ali *et al.*^[13] in line with the National Asthma Education and Prevention Program (NAEPP) guidelines, the correct use of MDI involves eleven steps. These steps include:

1. Shake the contents well
2. Remove cap
3. Hold the inhaler upright
4. Tilt the head back slightly
5. Breathe out slowly
6. Open mouth with inhaler 1–2 inches away in the mouth with the lips tightly sealed around it
7. Begin breathing in slowly and deeply through the mouth and actuate the canister once
8. Hold breath for 10–20 s
9. Exhale and wait one minute before the second dose
10. Shake again before the second dose
11. After use, replace the mouthpiece cover.

Steps number 1, 5, 6, 7, and 8 were identified as the critical steps and must be properly applied to maximize benefits.

Improvement in inhaler technique could be enhanced by methodical education with proper demonstrations from health-care professionals^[14-17] who must have basic knowledge and skills needed to correctly educate their patients. The community pharmacist as the most accessible health-care professional with the key roles of ensuring the safe, appropriate, and effective use of medicines is therefore indispensable in providing this education and training to their patients. Therefore, there is a necessity to evaluate the community pharmacists' knowledge of the appropriate use of MDIs.

Methods

This was a cross-sectional study carried out in two major cities, namely Awka and Onitsha in the state of Anambra, Nigeria. According to the office of the Director of Pharmaceutical Services in the state, about 56 pharmacists were duly registered in both cities (Awka and Onitsha) at the time of carrying out this study.

A total of forty-one registered pharmacists were randomly selected for the study using simulated patient approach. The method of Ali *et al.*,^[13] with brief modifications, was used for the study. Two adequately trained undergraduate students from the fourth and fifth year of the Faculty of Pharmaceutical Sciences, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria, were used. The students were trained using the 11-step guidelines on the appropriate use of MDIs for the management of Asthma as adapted from the NAEPP by Ali *et al.*^[13] Without prior briefing or notice to the pharmacists, one of the students accompanied with the other as a friend presented to the pharmacists as newly diagnosed asthma patient requesting for assistance on how to use his MDI with other asthma medications. This was done to simulate a real-life event. As the pharmacists demonstrated the use of the MDI to the mock newly diagnosed asthma patient, the friend noted down the steps as correctly or not correctly demonstrated into a coded form which was later used for further analyses. The students socialized with the pharmacists to obtain sociodemographic information thereafter.

Data analysis

The data collected were analyzed using Statistical Package for Social Sciences Program Software version 18.0 (SPSS Inc., Version 18.0, Chicago, IL, USA). Frequency analysis was conducted for the demographics, and the average scores on the demonstrations for the pharmacists were computed. One-way ANOVA was used to determine if gender, age, and years of experience had any effects on pharmacists' ability to demonstrate the correct use of MDI. A $P < 0.05$ was considered statistically significant.

Ethical considerations

Ethical approval for the study was obtained from the Ethics Committee of the Nnamdi Azikiwe University Teaching Hospital, Nnewi, Anambra State, Nigeria. Confidentiality of participating pharmacists and pharmacies was maintained throughout the study.

Results

Only one pharmacist refused to demonstrate the procedures. More than two-thirds of the pharmacists were male (73.2%) and 26.8% were female with a mean age of 45 years \pm 3.25. While all the pharmacists had Bachelor of Pharmacy as their first degrees, 2.4% had D. Pharm and 19.51% had Masters in Pharmacy degree [Table 1].

The pharmacists' demonstration ability mean score was 45.45%. As presented in Table 2, only step 2, 6, 7, and 8 were demonstrated by $\geq 50\%$ of the pharmacists. Step 7, which involved breathing in slowly and deeply through the mouth and then depressing the canister once was demonstrated mostly by the practicing pharmacists (90.2%). Other steps that were satisfactorily demonstrated by the pharmacists were step 6 (75.6%) and step 2 (63.4%). On the other hand, more than half of the practicing pharmacists failed to demonstrate all other steps correctly.

Among the five critical steps identified in the 11-step guidelines used, only steps 6, 7, and 8 were demonstrated by more than half of the surveyed pharmacists while a very small number of pharmacists correctly demonstrated steps 1 and 5.

Table 1: Sociodemographic characteristics of the community pharmacists

Variable	Frequency (%)
Gender	
Male	30 (73.2)
Female	11 (26.8)
Age (years)	
20-39	12 (39.3)
40-59	13 (31.7)
≥ 60	5 (12.2)
Qualification	
B. Pharm	41 (100)
D. Pharm	1 (2.4)
M. Pharm	8 (19.51)
Years of practice	
1-4	9 (21.9)
5-8	2 (4.9)
≥ 9	30 (73.2)

Table 2: Demonstration of steps for using metered dose inhalers by the community pharmacists

Number	Steps	Number of pharmacists correctly demonstrating the steps (%)
1	Shake the contents well*	16 (39)
2	Remove cap	26 (63.4)
3	Hold the inhaler upright	15 (36.6)
4	Tilt the head back slightly	6 (14.6)
5	Breath out slowly*	13 (31.7)
6	Open mouth with inhaler 1-2 inches away or in the mouth with the lips tightly sealed around it*	31 (75.6)
7	Begin breath in slowly and deeply through the mouth and depress the canister once*	37 (90.2)
8	Hold breath for 10-20 s*	21 (51.2)
9	Exhale and wait 1 min before the second dose	18 (43.9)
10	Shake again before the second dose	13 (31.7)
11	Replace the mouthpiece cover after use	9 (22)

*Critical steps

Further analysis showed that gender, age, and years of practice did not significantly influence the demonstrations ability of the community pharmacists in the study.

Discussion

On the average, the community pharmacists' demonstration of the appropriate use of MDI was poor. The introduction of MDIs is a major innovation in the therapeutic management of asthma because of the direct delivery of its medications to the respiratory system thus reducing the first pass effect while minimizing the systemic side effects. According to Al-Hassan,^[8] the treatment outcomes for asthmatic patients on MDIs are widely dependent on the appropriate use of the inhalers. The understanding of the appropriate use of these inhalers is dependent on the health-care professionals who must educate and counsel these patients. Hence, the need to ascertain the knowledge of these health-care professionals on these devices use. The pharmacists as the first point of call for most patients and as the member of the health-care team primarily charged with the responsibility of drug dispensing and counseling have greater responsibility in this education and demonstration of correct medication/device use.

Like in other countries, poor asthma device use techniques, especially the inhalational agent devices has been identified to be one of the major contributors to poor asthma control in Nigeria with a resultant increase in asthma symptoms, lifestyle restrictions, and increased emergency care visits.^[10,17] This poor device use techniques have been blamed on the inadequate education of the patients by the health-care providers.^[10]

The poor demonstration observed in this study is similar to findings from other countries that reported a high proportion of health-care professionals showing incorrect inhaler use technique.^[9,11] The most commonly demonstrated step by the community pharmacists was step 7 which involves "Begin breathing slowly and deeply through the mouth and to depress the canister once" while step 4 which involves "tilting of head back slightly" was the least.

Further analysis of the results showed that there was no influence of gender on the ability of the community pharmacists to demonstrate the step, similar to the findings of Chafin *et al.*^[19] Similarly, qualification and years of experience had no impact on the outcome of the scores of the respondents. However, the reports of Odili and Okoribe^[20] observed that pharmacists with D. Pharm showed a better performance. The poor inhaler use technique observed among the practicing pharmacists in this region may be due to lack of training and retraining of the practicing pharmacists. It has been shown by most researchers that routine training and retraining of health-care providers through continued professional development could improve the MDI use skills of both the health-care providers and the patients.^[13,20] Hence, there is a need to commence training and retraining of practicing pharmacists in this region on current activities in asthma management. This could form a part of the annual Mandatory Continuing Professional Development organized

by the Pharmacists Council of Nigeria which is designed to update the knowledge and skills of pharmacists in current trends and global best practices in pharmacy.

One limitation of this study is that the presentation of the simulator may have influenced the pharmacists' demonstration which may have affected the entire result. Second, not purchasing the inhaler from the premise may have led to the loss of the pharmacists' interest leading to the shabby demonstration. Recording of the demonstrations which were not carried out would have led to more reliable scoring since it was only one scorer that was used.

Conclusion

This study showed that community pharmacists in the region lack the proper knowledge and skills to demonstrate the use of MDIs to their patients. Hence, implementing training programs focusing on the use of these devices will enable practicing pharmacists to educate and impart knowledge on the effective use of MDI to their patients.

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Conflicts of interest

There are no conflicts of interest.

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