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Assessment of Asthma Inhaler Technique in Two Community Pharmacies

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Keywords: asthma, inhalers, patient education

Abstract

Objectives: To 1) assess inhaler technique in patients with asthma who present to a community pharmacy and 2) determine if patients find it desirable to have further inhaler education from pharmacists.

Methods: Participants were recruited when picking up their inhalers at either one chain or one independent pharmacy from May 2012 to December 2012. Any person 18 years of age or older, diagnosed with asthma, and currently prescribed an inhaler was eligible for inclusion in the study. Those who voluntarily agreed to participate were provided a written survey to evaluate current inhaler usage and past education from pharmacists. Participants were then asked to demonstrate how they currently operate their inhalers and observations regarding technique were recorded. Participants were then educated on what improvements could be made in their technique, if applicable.

Results: A total of 31 surveys were completed for this study, of which only 3(9.6%) of the respondents were observed to be using their inhalers properly; however 18(58%) rated their technique as a 5 out of 5 on a Likert scale with 5 being the best. Almost all respondents (96.7%) classified their inhalers as "easy" or "very easy" to use, and 13 (41.9%) would prefer more education from pharmacists regarding their inhalers.

Conclusion: The results of this study identified a significant need for patients to be educated on proper inhaler technique. It also revealed a high patient preference for pharmacists to offer additional education to patients using asthma inhalers upon initiation of inhaler therapy and with inhaler refills.

Introduction

Asthma is an incurable, but manageable disease that affects approximately 25 million Americans.¹ Evidence shows that the effectiveness of asthma drug therapy is dependent upon patients using their inhalers correctly.² Poor outcomes or failed responses to an asthma medication regimen may lead to unnecessarily increasing the dose or starting additional therapy for an asthma patient's treatment. The utilization of additional therapies increases healthcare costs, may increase a patient's risk for adverse side effects and will likely continue to be ineffective if incorrect inhaler technique is the underlying cause of a poor response to treatment.

Approximately 5-7 million dollars are wasted annually because of incorrect inhaler use;³ and medical expenses associated with asthma in the United States continue to rise.⁴ Pharmacists have the ability to play an integral role in educating patients to help reduce these costs directly and indirectly. On average, five work days were missed in 2008 because of asthma.⁴

Patients may find it challenging to take their asthma inhaler

medication as prescribed, differentiate between their maintenance and rescue inhalers and correctly operate their inhalers. Asthma inhaler technique is particularly important as correct technique assures that the medication reaches the site of action which allows the medication to exert its' pharmacological effect.⁵ Another very important factor is that patients and healthcare providers may be unaware that inhalers are not being used properly which creates confusion as to why the current treatment regimen is not effective. Patients may decline education regarding their inhalers because they feel that their inhalers are easy to use and believe they are using them correctly.

Pharmacists are considered the most accessible health care provider and are ranked amongst the top three most trusted professions in honesty and ethical standards.^{6,7} Due to these societal views and ease of access, pharmacists have the opportunity to be key educators for improving the inhaler use of asthma patients. Identifying factors associated with inhaler misuse can reduce costs and improve the quality of life for patients with asthma. This study surveyed participants about current inhaler use and observed inhaler techniques via demonstration to analyze the frequency of inhaler misuse. This helped to determine if there is a need and desire for more educational intervention from pharmacists.

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Objectives

The objectives of this study were (1) to assess inhaler technique in patients with asthma who present to a community pharmacy and (2) determine if patients find it desirable to have further inhaler education from pharmacists.

Methods

The study was approved by the Institutional Review Board at West Virginia University and was conducted from May 2012 through December 2012. Participants were recruited when picking up their inhalers at either a chain pharmacy in Westover, WV or an independent pharmacy in Monroeville, PA. Pharmacies were selected based on the current employment and practice sites of the investigators. Both pharmacies were located in suburban areas with a lower-to-middle socioeconomic class population. Any person 18 years of age or older, diagnosed with asthma, and currently prescribed an inhaler was eligible for inclusion in the study. Those who voluntarily agreed to participate were asked several questions regarding current inhaler usage and past education from pharmacists. Two separate surveys were utilized. One survey pertained to rescue inhalers and the other survey for maintenance inhalers. Participants were then asked to demonstrate how they currently operate their inhalers using a placebo device and observations regarding their technique were recorded. Participants were then educated on what improvements could be made in their technique, if applicable.

Survey questions and main observational elements to note during demonstration were developed by the research team based on manufacturers' recommended technique. Survey questions assessed type of inhaler used, length of inhaler use, and opinion on the difficulty of inhaler use. A five-point Likert scale was used to measure the participants' assessment of how accurately they felt they operated their inhalers. Participants were questioned about previous education received and their opinion on the quality of the education from pharmacists. Participants who were able to accurately complete all sections of the observational checklist were considered to have adequate technique, whereas anyone who did not accurately complete all sections was considered to have inadequate technique. All participants' surveys remained anonymous. The primary investigator conducted the survey, observed and recorded results from the inhaler demonstrations and educated the participants on improvements.

Results

A total of 31 surveys were provided to patients and completed for this study. All participants were over the age of 29 with a majority being female (64.5%). There were 77.4% of

the respondents who reported using a metered dose inhaler and 22.5% using a dry powdered inhaler. Only 9.6% of the respondents were observed to be using their inhalers properly with an average of 2.03 errors per survey. Despite the large majority of participants having incorrect inhaler technique, almost all respondents (96.7%) classified their inhalers as "easy" or "very easy" to use. Approximately half of the participants (58%) rated their technique as a 5 out of 5 on a Likert scale with 5 indicating best technique. There were 41.9% of respondents who would prefer more education from pharmacists regarding their inhalers. Maintenance inhalers were reported to be used as prescribed in only 61.5% of the respondents. This study found that 88.9% of the participants reported using their rescue inhaler more than 2 times per week, and 77.8% reporting daily use of rescue inhaler, which indicates inadequate control.⁸

Discussion

The main finding of this study is that the majority of the participants were not able to operate their inhalers properly. Additionally, approximately half of participants would prefer more education from pharmacists regarding their asthma inhalers. Participants who had been previously educated on inhaler technique had mixed results on whether they felt it was beneficial or not. There were 45% who felt it was helpful or very helpful and 29.1% who felt it was not helpful or only somewhat helpful. The differing opinions may in part be due to a lack of standardization in education provided. Also, the length of time for inhaler use showed no improvement in the ability to use proper technique, conflicting with the common perception of improvement with time. Participants revealed substantial self-confidence in their ability to properly operate inhalers that did not coincide with their technique. Pharmacists need to be aware that patients with asthma may convey a comprehensive perspective in their ability to use their inhalers properly, which may not be an accurate reflection of their actual technique.

Another major finding in this study was that there is a need for pharmacists to reinforce to patients with asthma the importance of adhering to their maintenance inhaler regimen as 38.5% of the participants reported not using their maintenance inhalers as prescribed. Adherence to asthma maintenance therapy is essential to optimum asthma control. A study involving 239 participants with asthma found that 83 patients were initially non-adherent and after education, 31 patients significantly improved their adherence. These patients were found to have had a reduced prescribed daily dose of their inhaled corticosteroid ($p < 0.001$), reduced rescue prednisolone courses ($p < 0.001$) and reduced hospital admissions ($p = 0.006$).⁹ Pharmacists can recognize patients who are non-adherent by evaluating patient's refill history of

their maintenance inhalers. Pharmacists can reinforce the importance of using the maintenance inhalers as prescribed with the patient during their routine visits to the community pharmacy.

In addition to maintenance inhaler adherence, rescue inhaler usage is important in asthma therapy management. A key element in identifying potential patients with asthma in need of inhaler technique education and monitoring is an increased use of rescue inhalers beyond two times per week. This study revealed that the majority of the participants (88.9%) were using their rescue inhalers more than two times per week. Pharmacists can question patients with asthma during their routine visits to the pharmacy about frequency of rescue inhaler use and analyze patients' refill history to help improve asthma therapy management.

According to the expert panel of the National Heart, Lung, and Blood Institute's *Guidelines for the Diagnosis and Management of Asthma*, pharmacist intervention may help improve asthma outcomes.¹⁰ A recent study of 336 patients assessing community pharmacist intervention on asthma control found an increased number in controlled asthma patients by 30.1% ($p < 0.001$), improved medication adherence by 40.3% ($p < 0.001$) and improved inhaler technique by 56.2% ($p < 0.001$). There were no significant changes found in the control group.¹¹ Another study assessing community pharmacist inhaler education involving 757 patients found that 597 (78.9%) patients made at least one error while performing their inhalation at baseline and after the patients were educated on proper technique the number dropped to only 214 (28.3%) patients at the follow-up ($p < 0.001$).¹² Although the benefit of proper asthma inhaler technique is known, there is still a lack of adequate asthma education from healthcare providers, including pharmacists. For example, a study in the emergency department found that only 40.7% of those admitted with asthma complications had received any education on how to use the inhaler.¹³ Another study found that 90% of participants indicated that their community pharmacist "never" or "sometimes" discussed the management of their asthma with them.¹⁴ This overall lack of education found in these previous studies can be correlated to the findings of this study with the majority of patients not properly using their asthma inhalers.

Pharmacists may also take an active role in improving patients' with asthma inhaler technique by assessing patients' past medical histories. In a previous study's findings, patients with improper use of asthma inhalers had a significant association with three or more emergency department visits.¹⁵ Pharmacists can question to see if there have been

any recent hospitalizations due to asthma exacerbations or check to see if they have been prescribed short-term oral steroids for a severe exacerbation. These assessments can allow the pharmacists to obtain a better understanding of their patients' level of asthma control and the need for further intervention.

The deficit in proper inhaler technique by patients and lack of education provided by pharmacists also proposes the question if this is due to the lack of reimbursement to pharmacists for these services. Although proper inhaler technique can subsequently lead to improved patient outcomes and decreased healthcare costs, pharmacists have limited capacity to provide these services due to the lack of time and reimbursement for services. Community pharmacists have the ability to bill Medicare part D for Medication Therapy Management services, however, no billing codes exist for separate educational sessions pertaining to asthma inhaler education. Without pharmacist recognition as healthcare providers under Medicare and limited billing codes, a challenging environment is created for pharmacists to be able to provide these beneficial asthma therapy management or educational services.

This study has examined the prevalence of inadequate inhaler technique and the need for continued education beyond the initial fill of an inhaler for patients with asthma. Reviewing proper inhaler technique when patients pick up prescription refills and then following up to assess improvements may have the potential to decrease costs of additional medications added to the patient's regimen, decrease costs associated with additional physician visits, and decrease costs associated with emergency department visits. Also, preventing additional medications or increased dosages may have the potential to decrease adverse side effects associated with those medications, decrease total medication costs and improve the quality of life for patients with asthma. This research contributes to the current literature that recognizes the extensive need for improvement in asthma inhaler technique. The current room for growth in pharmacist interventions and the extensive amount of money wasted annually due to inhaler misuse requires an improved educational approach in patients with asthma.

Limitations

There were a small number of participants due to the difficulty in reaching patients with inhalers because of pharmacy delivery services, drive thru use, and other people picking up the prescriptions for the patients. The study was based out of 2 pharmacies in a particular region so future studies would need to assess other geographic locations. Participants were asked to demonstrate inhaler use with a

placebo inhaler in front of an investigator, so technique may have been temporarily altered from normal routine use. Findings were not proven to have statistical significance due to the small sample size and only three patients using their inhalers correctly.

Conclusion

The results of this study illustrate the need for patients to be educated on proper inhaler technique. The findings of this study along with those previously mentioned have introduced a common theme of frequent inadequate inhaler use in patients with asthma and the ability for pharmacists to be key educators. Improvement in inhaler technique may lead to better drug therapy management, decrease in healthcare costs, and better asthma control in patients with asthma. As community pharmacists are the most accessible healthcare provider, our results reinforce the need for them to educate all patients using inhaled medications, even if it is for a refill. Further research is still needed to expand upon the effectiveness of pharmacists' interventions with asthma patients' inhaler use and the feasibility for them to provide these beneficial services with current limited mechanisms for reimbursement.

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Table 1. Participant responses to survey questionnaire

TOTAL	n=31
	# (%)
<u>Time length of inhaler use</u>	
< 1 month	3 (9.7)
1-6 months	2 (6.5)
6-12 months	5 (16.1)
1-5 years	7 (22.6)
> 5 years	14 (45.1)
<u>Any previous counseling</u>	
Yes	23 (74.2)
No	8 (25.8)
<u>Was counseling beneficial</u>	
N/A	8 (25.8)
Not Helpful	3 (9.7)
Somewhat Helpful	6 (19.4)
Helpful	7 (22.5)
Very Helpful	7 (22.5)
<u>Inhaler difficulty</u>	
Very Difficult	1 (3.2)
Somewhat Difficult	0 (0.0)
Neutral	0 (0.0)
Easy	20 (64.5)
Very Easy	10 (32.3)
<u>Personal opinion scale on technique ability (1 worst-5 best)</u>	
Don't Know	1 (3.2)
1	1 (3.2)
2	1 (3.2)
3	1 (3.2)
4	9 (29.0)
5	18 (58.0)
<u>Prefer more education from pharmacists</u>	
Yes	13 (41.9)
No	18 (58.0)
<u>Was overall inhaler technique correct</u>	
Yes	3 (9.7)
No	28 (90.3)

Figure 1. Rescue Inhaler Survey

Rescue Inhaler Survey

Patient Age: _____

Sex: **M** **F**

1. What type of rescue inhaler do you currently use? *(Please Circle)*

Ventolin[®] **ProAir[®]** **Xopenex[®]** **Proventil[®]**

2. How long have you been using your rescue inhaler (SABA)? *(Please Circle)*

< 1 month **1-6 months** **6-12 months** **1-5 years** **> 5 years**

3. Have you ever been counseled on how to use your rescue inhaler?

YES **NO**

4. If you answered yes to the previous question, was the counseling you received beneficial to help improve your usage of your inhaler? *(If you have not been counseled circle N/A)*

N/A **Not helpful** **Somewhat helpful** **Helpful** **Very helpful**

5. How difficult do you find it to use your inhaler?

Very difficult **Somewhat Difficult** **Neutral** **Easy** **Very Easy**

6. On a scale of 1-5 how well do you think you use your inhaler? *(1 being the worst and 5 being the best)*

1 **2** **3** **4** **5**

7. Would you prefer more education from a pharmacist on how to use your inhaler?

YES **NO**

8. How often do you use your rescue inhaler? *(please circle)*

1-2 times/week **3-4 times/week** **1 time/day** **2-3 time/ day** **> 3 times/day**

Observations

- | | | | |
|--|----------|----------|------------|
| 1. Did the patient properly prime their inhaler before usage? | Y | N | N/A |
| 2. Did the patient shake the inhaler before usage? | Y | N | N/A |
| 3. Did the patient fully exhale before inhalation? | Y | N | |
| 4. Did the patient demonstrate proper inhalation technique? | Y | N | |
| 5. Did patient hold their breath after pressing down on inhaler? | Y | N | |
| 6. Did the patient discuss waiting between inhalations? | Y | N | |
| 7. Did the patient take only one breath for each puff? | Y | N | |
| 8. Did the patient discuss proper inhaler cleaning technique | Y | N | |

Additional Comments:

Figure 2. Maintenance Inhaler Survey

Maintenance Inhaler Survey

Patient Age: _____

Sex: M F

1. What type of maintenance inhaler do you currently use? *(Please Circle)*
Advair Diskus[®] **Flovent[®]** **Symbicort[®]** **Foradil[®]** **Pulmicort[®]** **Asmanex[®]**
2. How long have you been using your maintenance inhaler? *(Please Circle)*
< 1 month **1-6 months** **6-12 months** **1-5 years** **> 5 years**
3. Have you ever been counseled on how to use your maintenance inhaler? **YES NO**
4. If you answered yes to the previous question, was the counseling you received beneficial to help improve your usage of your inhaler? *(If you have not been counseled circle N/A)*
N/A **Not helpful** **Somewhat helpful** **Helpful** **Very helpful**
5. How difficult do you find it to use your inhaler?
Very difficult **Somewhat Difficult** **Neutral** **Easy** **Very Easy**
6. On a scale of 1-5 how well do you think you use your inhaler? *(1 being the worst and 5 being the best)*
1 **2** **3** **4** **5**
7. Would you prefer more education from a pharmacist on how to use your inhaler? **YES NO**
8. Do you regularly use your maintenance inhaler as prescribed? **YES NO**

Observations:

- | | | | |
|---|---|---|-----|
| 1. Did the patient properly prime their inhaler before usage? | Y | N | N/A |
| 2. Did the patient shake the inhaler before usage? | Y | N | N/A |
| 3. Did the patient properly load the capsule in the inhaler? | Y | N | N/A |
| 4. Did the patient fully exhale before inhalation? | Y | N | |
| 5. Did the patient demonstrate proper inhalation technique? | Y | N | |
| 6. Did patient hold their breath after inhalation? | Y | N | |
| 7. Did the patient take only one breath for each puff? | Y | N | N/A |
| 8. Did the patient discuss rinsing mouth with water after inhalation? | Y | N | N/A |
| 9. Is inhaler taken on a scheduled basis? | Y | N | N/A |
| 10. Did the patient discuss proper inhaler cleaning technique | Y | N | N/A |

Additional Comments: _____