

APhA Foundation 2020 Incentive Grant Report

Introduction

Inhaler adherence is critical for the effective management of chronic obstructive pulmonary disease (COPD) and asthma.^{1,2} According to a study evaluating the impact of adherence to inhaler treatment “poor adherence to inhaler treatment may be associated with suboptimal outcomes and disease exacerbation”.¹ The evidence from studies showed increased adherence reduces the risk of exacerbations, improves symptom management and patient outcomes.^{1,2,3} Common barriers to inhaler adherence are lack of communication from providers to patients and caregivers, language barrier, cost of inhalers, insurance restrictions, inhaler technique, and lack of transportation.⁴ Community pharmacist have the ability to implement solutions to resolve these barriers and increase inhaler adherence rates.

Pharmacists in Massachusetts can utilize the Massachusetts Immunization Information System (MIIS) to evaluate patient’s immunization records and provide recommendations. Influenza and pneumococcal vaccines have been proven to decrease the incidence of lower respiratory infections in patients with COPD and asthma.^{5,6} Community pharmacists can recommend and provide Advisory Committee on Immunization Practices (ACIP) vaccinations to patients with COPD and asthma including influenza, pneumococcal disease, herpes zoster, and tetanus-diphtheria.

The primary objective of the study was to evaluate the impact of a community pharmacist’s interventions can have on improving inhaler adherence in asthma and chronic obstructive pulmonary disease (COPD) patients. The community pharmacy resident was able to identify barriers to adherence and provide solutions to these issues. Solutions to improve adherence included automatic refills on maintenance inhalers, 90-day supply for inhalers, requesting alternative therapies for cost issues, combination inhalers to simplify therapy, and utilization of alarms as reminders to use inhalers. The secondary objective were to improve inhaler technique, offered all approved ACIP vaccines, and assessed the impact of pharmacist-driven services for asthma and/or COPD management through patient satisfaction survey. The In-Check DIAL device is a tool health-care providers can use to assess patient’s peak inspiratory flow rate. The device simulates the resistance characteristics of the MDI or DPI the patient is prescribed.⁷ The community pharmacy resident utilized this device and coached patients how to use their inhalers correctly.

Methods

Study Design: The protocol for this prospective, single-center study located at Walgreens community pharmacy was approved by the University Institutional Review Board. The community pharmacy resident identified appropriate patients for study inclusion during prospective drug utilization review (DUR) by reviewing medication profiles of patients who were filling or dropping off prescriptions for inhalers. Patients who were ≥ 18 years old with an active prescription for at least one maintenance or rescue inhaler and with inferred diagnosis of asthma or COPD were eligible to participate in the study. Exclusion criteria included patients < 18 years of age, pregnant patients, and patients who were unable to speak or understand English.

After patients were identified, the community pharmacy resident flagged the prescription for study recruitment. At the time of prescription pick up, the community pharmacy resident obtained informed consent for study participation. Communication regarding study recruitment with the patient was done

primarily by the community pharmacy resident. For patients that were picking up when the community pharmacy resident was not there or when caregivers picked up, the community pharmacy resident followed-up with a phone call about a week later to explain the study and have them come into the pharmacy for study participation.

Once consent was obtained, the community pharmacy resident completed a patient assessment form, gathered patient demographic information, and questions relating to missed doses of their inhaler, history of antibiotic or steroid use, and symptoms management. The community pharmacy resident also addressed barriers to adherence. The community pharmacy resident assessed inhaler technique utilizing the In-Check DIAL device, correcting poor technique when deemed necessary. The community pharmacy resident utilized the state immunization registry, noting which vaccinations were missing per Advisory Committee on Immunizations Practices (ACIP) for asthma/COPD patients and administered upon consent. Following the community pharmacy resident intervention, the patient completed a satisfaction survey evaluating the session. The community pharmacy resident then called the patient at 30 and 60 days from initial intervention to follow-up and verbally assess inhaler use, symptom management, and reviewed their inhaler fill history.

Statistical Analyses: Information gathered for the study was inputted into a password protected excel sheet for analysis. The data that was assessed was baseline inhaler technique and inhaler technique post education and percentage of patients whose adherence and symptoms improved at 30 day and 60 day follow-up. A quantitative analysis of missing vaccinations and administered vaccinations was prepared. Patient perception of pharmacist-led services was estimated using descriptive analysis.

Results and Discussion

A total of 44 patients were enrolled into the study. Baseline characteristics can be seen in Table 1. The average age for patients was 62 years old, with patients ranging from 21 to 93 years old. Fifty percent of the patients had asthma, thirty percent had COPD, and twenty percent had a combination of asthma and COPD. The average duration of disease was 27 years.

Primary endpoint analysis are summarized in Table 2 and Figure 1. When asked how well controlled are your asthma/COPD symptoms at the initial visit, 7 (15.9%) patients answered well. At the 60 day follow-up 20 (45.5%) patients answered well, indicating a 29.6% increase in symptom control. In regards to missed doses of their inhalers in the past week, 7 (15.9%) patients answered 0 missed doses at the initial visit. At the 60 day follow-up visit, 27 (61.4%) patients answered 0 missed doses, a 45.5% increase in inhaler adherence. The main reason patients stated non-adherence was lack of proper inhaler technique (19 patients, 43.2%). The second main reason for poor adherence was forgetfulness (11 patients, 25%).

The quantitative analyses of missing and administered vaccinations are shown in Figure 1. Fourteen patients were not offered vaccines due to COVID-19 restrictions, further discussed below. Of the 30 patients that were offered vaccines, the largest gap was found in zoster vaccines (35%) and the smallest gap found in pneumococcal conjugate vaccine (7%). Overall, there were missing vaccines in each of the ACIP recommended vaccination categories for patients with asthma and/or COPD. Of the gaps in vaccine history for the 30 patients, 63% of missing immunizations were administered by the community pharmacy resident. See Figure 1 for complete results.

Of the 44 patients enrolled, 30 patients (57 inhaler devices) were assessed for inhaler technique utilizing the In-Check DIAL device. The fourteen patients missing (27 unique inhaler devices) were not assessed for inhaler technique using the device due to COVID-19 restrictions. Of the 57 total inhaler devices that were assessed, only 9 of the inhaler devices had appropriate technique, as indicated by an In-Check DIAL green zone. The 48 inhaler devices that had inappropriate technique, as indicated by an In-Check DIAL red zone, 46 inhalers (96%) were corrected to the green zone following pharmacist-provided education. See Table 3 for complete results.

Patient satisfaction survey showed positive results toward pharmacist involvement in asthma/COPD management. Of the 44 patients, 88% of them believed it is important for a pharmacist to be involved in their asthma/COPD management and be involved in providing vaccinations. Ninety-one percent of patients believed it is important for a pharmacist to be readily available to answer any questions regarding their inhalers and medications. Ninety-three percent of the patients indicated they would be more likely to choose an insurance plan that covers pharmacist services. See Table 4 for complete results.

Patient recruitment was one of the limitations to this study. The study was done in a single pharmacy, in which the community pharmacy resident had limited time to recruit patients due to other responsibilities. The sample size was limited due to the single pharmacy. The sample size was decreased even further once COVID-19 restrictions were set into place. There was a limited number of patients coming in to the pharmacy, decreasing the opportunities to obtain consent for study participation. The community pharmacy resident was not able to assess inhaler technique for fourteen patients utilizing the In-Check DIAL device due to this restriction. In addition, the same fourteen patients did not receive their missing vaccinations. Since data is missing for fourteen (32%) patients, the results may be skewed and do not provide a full picture of the study.

Many of the eligible patients routinely had their caregivers pick up their inhaler prescriptions or used a delivery service, losing the opportunity to recruit them into the study. An appointment-based model could ensure increased participation if there was schedule time for one-on-one pharmacist driven education at the pharmacy.

Another study limitation was subjective data for the questionnaire to assess inhaler adherence and symptom management at initial education, 30-day follow-up and 60-day follow-up. Lastly, the patient satisfaction surveys were not anonymous, thus possibly causing bias in responses.

Conclusion

This study has shown that implementation of a pharmacist-driven service to optimize care for patients with asthma and/or COPD can help with inhaler adherence, technique, and fill gaps in immunization history. The results demonstrated that after an educational session with a pharmacist and follow-up visits, patient's inhaler adherence increased, therefore improving symptom management and disease control. The results also demonstrated that majority of the participants were not using their inhalers correctly, resulting in suboptimal control of their asthma/COPD. The community pharmacy resident's involvement in asthma/COPD management in providing clinical services shows how community pharmacists can expand their role in patient care. To truly evaluate these services that can be provided

by a community pharmacist to optimize care in patients with asthma/COPD, this study needs to be expanded to more than one pharmacy and in multiple communities.

References

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Table 1: Baseline Characteristics

n = 44 patients

Characteristics		
Mean age, years (range)		62 (21 – 93)
Sex	Male (%)	n = 17, (39)
	Female (%)	n = 27 (61)
Disease State	Asthma (%)	n = 22 (50)
	COPD (%)	n = 13 (30)
	Mixed (%)	n = 9 (20)
Average duration of disease state (range)		27 years (1 – 68)

Table 2: Primary Endpoint Results

n = 44 patients

	Initial, n	30 day follow-up, n	60 day follow-up, n
How well controlled are your symptoms?	Not = 5 (11.4%)	Not = 1 (2.3%)	Not = 0
	Minimally = 21 (47.7%)	Minimally = 11 (25%)	Minimally = 2 (4.5%)
	Moderately = 10 (22.7%)	Moderately = 23 (52.3%)	Moderately = 22 (50%)

	Well = 7 (15.9%)	Well = 9 (20.5%)	Well = 20 (45.5%)
How many times have you used your rescue inhaler in the past week?	0x = 3 (6.8%) 1-3x = 9 (20.5%) 4-6x = 12 (27.3%) 7-9x = 3 (6.8%) >10x = 13 (29.5%) 4x / year = 1 (2.3%) Not on rescue = 3 (6.8%)	0x = 3 (6.8%) 1-3x = 21 (47.7%) 4-6x = 11 (25%) 7-9x = 4 (9.1%) >10x = 2 (4.5%) 4x / year = 1 (2.3%) Not on rescue = 2 (4.5%)	0x = 9 (20.5%) 1-3x = 26 (59%) 4-6x = 5 (11.4%) 7-9x = 0 >10x = 1 (2.3%) 4x / year = 1 (2.3%) Not on rescue = 2 (4.5%)
How many times have you had shortness of breath in the past week?	0x = 4 (9.1%) 1-3x = 6 (13.6%) 4-6x = 15 (34.1%) 7-9x = 5 (11.4%) >10x = 14 (31.8%)	0x = 4 (9.1%) 1-3x = 21 (47.7%) 4-6x = 12 (27.3%) 7-9x = 5 (11.4%) >10x = 2 (4.5%)	0x = 11 (25%) 1-3x = 26 (59%) 4-6x = 6 (13.6%) 7-9x = 0 >10x = 1 (2.3%)
How many doses of your inhaler have you missed in the past week?	0x = 7 (15.9%) 1-3x = 10 (22.7%) 4-6x = 4 (9.1%) 7-9x = 4 (9.1%) >10x = 10 (22.7%) Rescue only = 9 (20.4%)	0x = 11 (25%) 1-3x = 16 (36.4%) 4-6x = 5 (11.4%) 7-9x = 2 (4.5%) >10x = 1 (2.3%) Rescue only = 9 (20.4%)	0x = 27 (61.4%) 1-3x = 7 (15.9%) 4-6x = 1 (2.3%) 7-9x = 0 >10x = 0 Rescue only = 9 (20.4%)

Table 3: Inhaler Technique Assessment

n = 57 unique inhalers

Baseline In-Check DIAL zone	N
Green	9 (16%)
Red	48 (84%)
Post-Intervention In-Check DIAL zone	N
Red	55 (96%)
Green	2 (4%)

Table 4: Satisfaction Survey Results

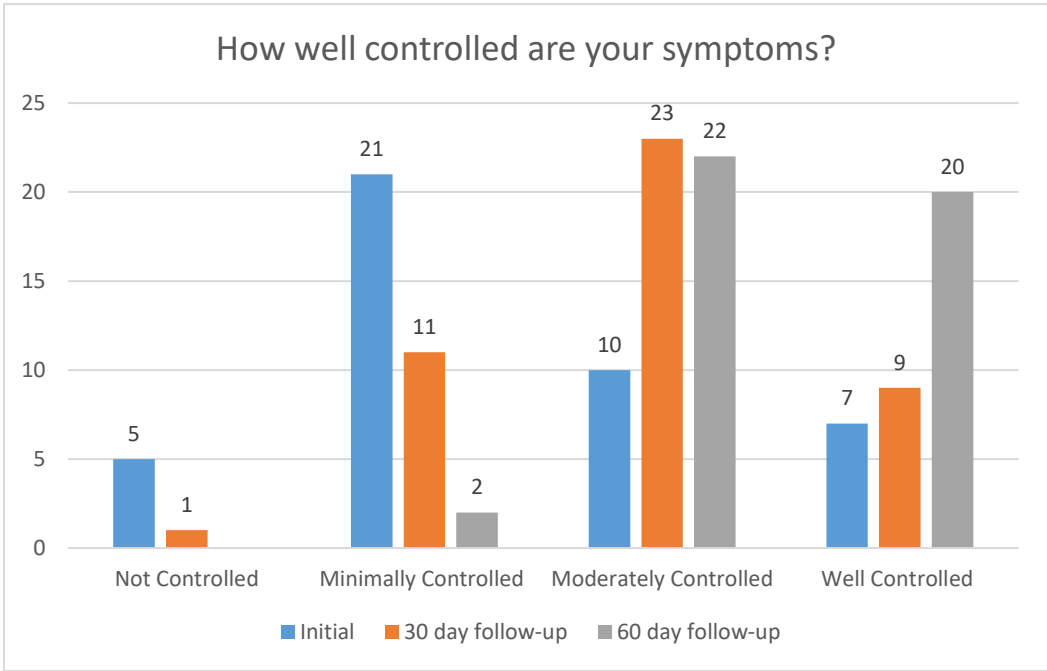
n = 44 patients

	Not very satisfied	Not satisfied	Neutral	Satisfied	Very satisfied
Please rate your overall satisfaction with service / education provided today	0	0	8 (18%)	21 (48%)	15 (34%)
	Not likely	Likely	Neutral	Most likely	Very likely
Please rate how likely you are to refer this service to a friend / relative	0	7 (16%)	3 (7%)	13 (30%)	21 (48%)
Please rate how likely you are to change the way you use your inhaler after speaking with the pharmacist	0	4 (9%)	2 (5%)	6 (14%)	32 (73%)

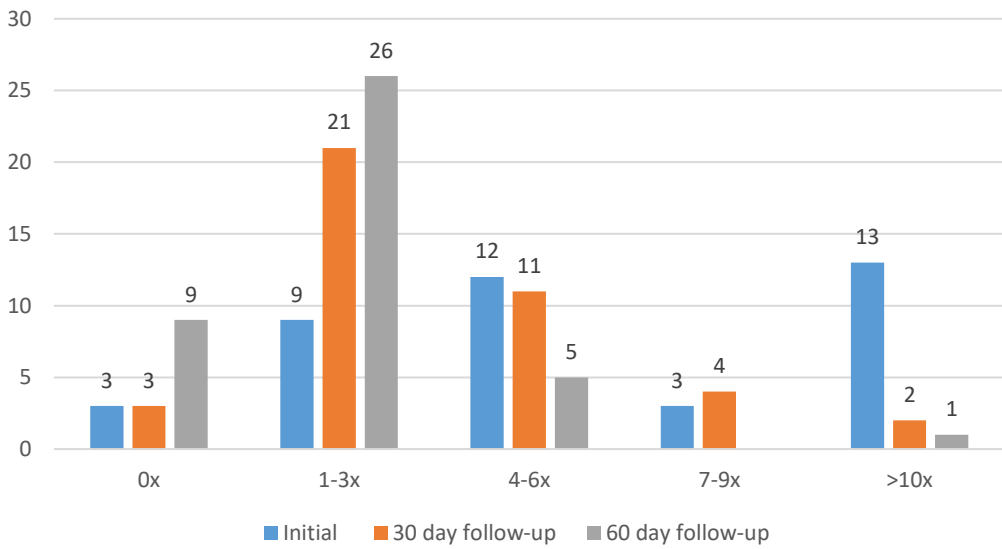
	Not important	Not very important	Neutral	Important	Very important
Please rate how important you believe it is for your pharmacist to be involved in your asthma/COP management	0	2 (5%)	3 (7%)	11 (25%)	28 (63%)
Please rate how important you believe it is for your pharmacist to be readily available to answer any questions regarding your inhaler/medications	0	0	4 (9%)	8 (18%)	32 (73%)
Please rate how important you think it is for your pharmacist to be involved in providing vaccinations	0	2 (5%)	3 (7%)	8 (18%)	31 (70%)
	Yes	No			
Would you be more likely to choose an insurance plan that covers pharmacist services?	41 (93%)	3 (7%)			

Figure 1: Primary Endpoint Results

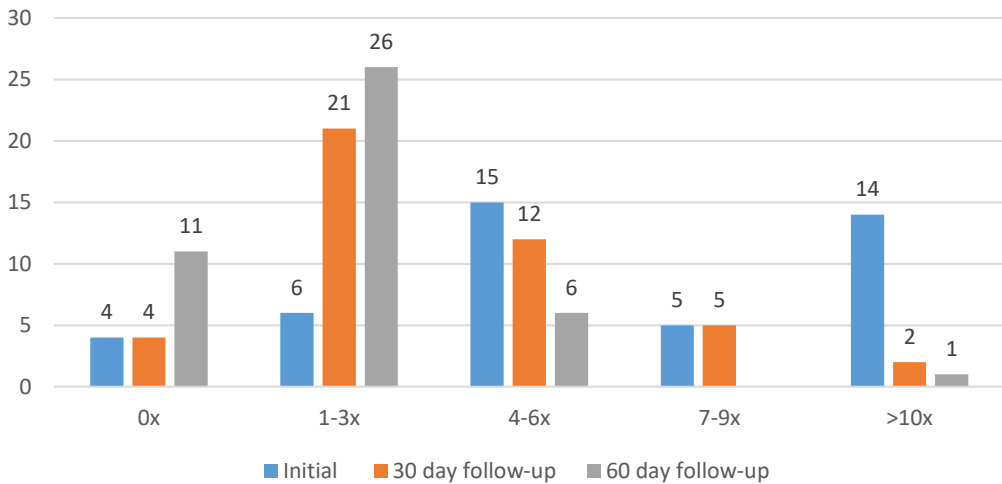
n = 44 patients



How many times have you used your rescue inhaler in the past week?



How many times have you had shortness of breath in the past week?



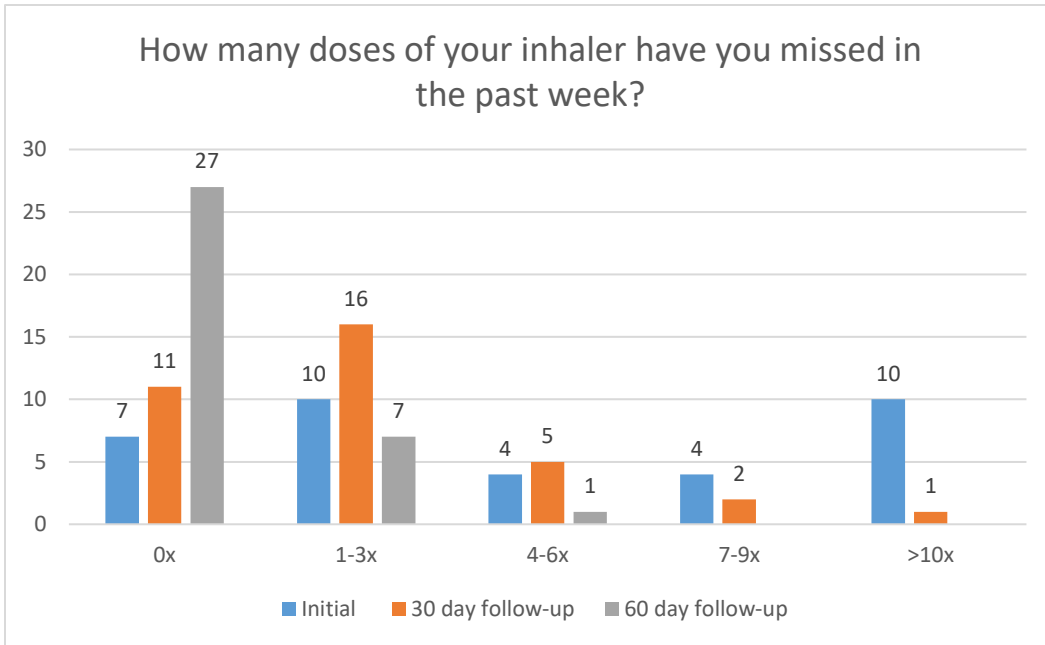


Figure 2: Vaccinations

n = 30 patients

