

Asthma Adherence Management for the Clinician

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BACKGROUND: Nonadherence to asthma treatment has been related to increased hospital and emergency care, morbidity, and unnecessary costs. Improving patient adherence is a key component to achieving optimal outcomes.

OBJECTIVE: Review barriers, interventions, and communication skills shown to be effective in promoting asthma adherence.

METHODS: Asthma adherence literature was reviewed.

RESULTS: Sequential management principles to achieve adherence include the following: (1) measuring adherence, (2) identifying barriers that result in nonadherence, (3) using specific strategies to overcome barriers; and (4) using communication skills to enhance the delivery of selected strategies.

CONCLUSION: Careful attention to adherence management principles may increase adherence, enhance outcomes, and reduce unnecessary morbidity and cost. The case described applies these principles and gives the reader a framework to review. © 2013 American Academy of Allergy, Asthma & Immunology (J Allergy Clin Immunol: In Practice 2013;1:123-8)

Key words: Adult/child asthma; Adherence; Outcomes; Patient-centered communication; Health beliefs; Barriers

CASE REPORT

Nonadherence to asthma treatment has been related to increased hospital and emergency care,^{1,2} mortality,³ use of oral corticosteroids,¹ decreased pulmonary function,⁴ cost of care,⁵ and reduced quality of life.⁶ This article provides a clinical framework to enhance patient adherence by (1) diagnosing adherence status, (2) identifying the reasons (barriers) for nonadherence, (3) selecting the specific strategy that matches the patient's concern, and (4) identifying communication strategies to enhance the effectiveness of the specific strategy.⁷ Adherence to asthma medication focuses on inhaled corticosteroid (ICS)

therapy because it is the most widely used and is recommended by the Expert Panel Report 3,⁸ except for mild asthma.

A 31-year-old man was referred after a recent 4-day hospital admission for asthma, his second in the past year. Evaluation for factors that precipitate asthma, (gastroesophageal reflux disease, sensitivity to nonsteroidal anti-inflammatory drugs, atopy, sinusitis) were negative. Chest x-ray and α -1-antitrypsin were negative. The patient stated that he had been regularly taking the following medications: beclomethasone 80 two inhalations twice daily; theophylline 400 mg twice daily, albuterol 2 inhalations every 4 hours as needed. Pulmonary function tests were as follows: forced vital capacity: 88%; FEV₁: 63%; and forced expiratory flow at 25% to 75% of forced vital capacity: 35% predicted. A possible factor that precipitated hospitalization was excessive running during a softball game. An adherence evaluation showed theophylline level <2.0 μ g/dL and no previous beclomethasone refill in the past 6 months according to pharmacy records. Asthma adherence survey identified concerns about cost of copays, corticosteroid side effects, and need for daily preventative ICS treatment. An asthma information assessment identified poor comprehension of the action, side effects, and rationale for daily use of inhaled steroids; no prior use of a peak flow meter; and no written asthma action plan. The physician recommended discontinuing beclomethasone and theophylline and starting combination inhaled long-acting β_2 agonist (LABA)/corticosteroid to increase control and decrease the number of copays.

The patient received an asthma education program from the nurse practitioner (NP) to evaluate the problems and concerns with care identified in the paragraph above. When asked about his primary concern, the patient questioned the need for daily treatment. The NP suggested the use of the peak flow meter as a way to determine his need for maintenance treatment. After consultation with the physician, the NP recommended not to use the combination treatment for 2 weeks and to measure peak flow twice daily. At the end of 2 weeks the patient was to start using the combination inhaled medication and to continue peak flow measurements until the next visit in 2 weeks. With the patient's consent, the NP attached an electronic adherence-monitoring device for the combination metered-dose inhaler (MDI).

At follow-up 4 weeks later, the patient recognized the benefit of daily combination LABA/ICS. He had less symptoms and higher peak flow values during the second 2-week interval. Review of adherence monitoring showed use of combination treatment 10 days twice daily and 4 days every day. These results were discussed with the patient, and he agreed to continue this new medication plan twice daily because it was effective.

DEFINITION OF ADHERENCE

The term *compliance* has been used to define "the extent to which patients follow physician instructions, prescriptions, and proscriptions." It implies that treatment decision making was entirely the physician's responsibility and the patient must obey or acquiesce.⁹ *Adherence* is defined by the World Health

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No funding was received for this work.

Conflicts of interest: A. Weinstein has received consultancy fees from Merck and the Asthma and Allergy Foundation of America, is president of Asthma Management Systems, has received research support from the National Institutes of Health and Merck (electronic adherence monitors supplied by Nexus 6), has a pending US patent application in process, and is a developer for AsthmaPACT.

Received for publication December 31, 2012; revised January 24, 2013; accepted for publication January 28, 2013.

Cite this article as: Weinstein AG. Asthma adherence management for the clinician. J Allergy Clin Immunol: In Practice 2013;1:123-8. <http://dx.doi.org/10.1016/j.jaip.2013.01.009>.

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<http://dx.doi.org/10.1016/j.jaip.2013.01.009>

Abbreviations used

ED- Emergency department
ICS- Inhaled corticosteroids
LABA- Long-acting β_2 agonist
MDI- Metered-dose inhaler
NP- Nurse practitioner
SDM- Shared decision making

Organization as the extent to which a person's behavior—taking medication, following a diet, and/or executing lifestyle changes—corresponds with agreed recommendations from a health care provider.¹⁰ The main difference between adherence and compliance is that adherence is consensual. It requires the patient's agreement to the recommendations, that patients should be active partners with health professionals in their own care, and that good communication between patient and health professional is necessary for an effective clinical practice.¹⁰

FORMS AND EXTENT OF NONADHERENCE

Nonadherence with medication can be classified as primary and secondary. Primary nonadherence (failure to get the initial prescription refilled) has been reported to be 25.2% in patients with a chronic disease who receive new medication with e-prescribing.¹¹ Secondary nonadherence (underuse of therapy or premature discontinuation of treatment) by patients with asthma is estimated to be 30% to 70%.¹² This varies widely in relation to age, types of medication, clinical setting, severity, and type of measure used.¹⁰

In a US adult asthma clinic, adherence over 1 year was determined by prescription refill to be 21% for theophylline and 41% with ICS over 12 months.¹³ Bender et al¹⁴ examined refills of fluticasone/salmeterol over 12 months in > 5500 patients.⁴ On average, patients filled enough medication to cover 22.2% of days, and more than one-half of the patients filled a 30-day prescription only once during the 1-year period.¹⁴ With the use of electronic adherence monitors Onyirimba et al¹⁵ found in an inner city population that adherence to ICS decreased by 50% in 1 week and dropped as low as 20% after 12 weeks.¹⁵ Krishnan et al¹⁶ with the use of an electronic monitor also found a 50% decrease in ICS usage after discharge from the hospital intensive care unit. A 1979 study that examined adherence to theophylline, a widely-used prophylactic medication of that era, found that only 2% of children had a therapeutic level when seen in the emergency department (ED).¹⁷ A recent study of adult patients followed in a health maintenance organization (HMO) identified adherence of persons by using prescription refill data. Patients with 25% or less adherence to ICS was more likely to be seen in the ED.¹⁸

EVALUATING THE DEGREE OF PATIENT ADHERENCE

Physicians have a variety of methods to determine patient adherence.¹⁹ Several methods that are appropriate for current clinical care are considered here and permit clinicians to determine whether symptoms are secondary to treatment failure compared with failure to administer treatment.²⁰

Self-report, asking a patient about medication use, or the patient keeping a diary, is not an accurate measure. Patients may not want to disappoint a provider and may overestimate

medication use.²¹ As a result, clinicians tend to overestimate patient adherence.²¹ Studies that compare patient diary with electronic adherence devices showed the weakness of patient report.²² One way to estimate adherence with the patient in the clinic is to ask a question that suggests that most patients do not follow directions fully: "I realize that it is difficult to take your asthma medication twice a day, every day. In 4 weeks you would need to use your inhaler 28 times. Most of my patients take their medicine 60% to 70% of the time. How do you do?" The validity of self-reported nonadherence was shown by Choo et al²³ who compared patient report, pill count, and electronic monitoring device and automated pharmacy records. Thus, a patient history of nonadherence should be believed and is diagnostic as long as the clinician places the patients in an atmosphere where they are comfortable telling the truth.¹⁰

Electronic monitors for MDIs are able to identify the pattern of medication use for at least a month, giving the opportunity to review these results with the patient in relation to symptoms and lung function measures at home.²⁴⁻²⁶ Their disadvantage is cost. The Doser CT is less expensive, records only 30 to 45 days of data, and does not generate an electronic record for the clinician of date and time of use.²⁷ SmartInhaler technology is more expensive, provides documentation of the patient's adherence record, and can be applied to a greater variety of MDIs (aerosol and dry powder) currently in use. It also provides audible feedback as reminders and includes wireless capability to permit remote monitoring.²⁸ At this time, clinical use of electronic monitors should probably be reserved for patients with more severe asthma with increased health care use.^{20,26} They should also be considered for research projects to ensure that subjects are following the protocol.^{25,29}

Patient questionnaires have been used to assess adherence to asthma treatment. McHorney et al³⁰ developed a 3- question survey, the Adherence Estimator, which identifies a patient's (1) perceived need for medications, (2) perceived concerns for medications, and (3) perceived affordability of medications. Weinstein et al have developed a web-based questionnaire, AsthmaPACT,³¹ to identify 12 causes/barriers of patient nonadherence. Both child³² and adult³³ questionnaires were validated by evaluating patient/parent statements of self-reported nonadherence to anti-inflammatory treatment and risk factors for nonadherence. Schatz (unpublished data) enrolled 420 adult patients with asthma who were receiving ICS and followed them for 1 year. They identified the following 5 statements: "I follow my medication plan," "I do not need preventive treatment," "I forget at least one dose per day," "My ICS causes side effects," and "I cannot afford my medication." All 5 statements were related to asthma control. Following the medication plan, forgetting, and not needing medication were significantly related to adherence measured by prospective ICS refill. A validated questionnaire for assessing adherence facilitates identification of self-reported nonadherence and specific patient barriers that may lead to interventions that are specific for that person.¹⁰

Pharmacy prescription refill databases have proved valuable in assessing adherence. Local pharmacies may also be helpful in giving individual patient prescription refill data. By 2012 electronic medical records provided e-prescribing for 45.6% of physicians in the United States.³⁴ E-prescribing has been shown to improve first-fill adherence 10% compared with paper prescriptions.³⁵ Although refill information does not answer the question of actual medication use, it does give data whether the

medicine was obtained by the patient. Prescription adherence has been related to asthma outcomes.³⁶

One can compute adherence by calculating the average daily medication dispensed from the inhaler over the time evaluated.³⁷

Blood and saliva measures of theophylline, an oral bronchodilator, were commonly used to evaluate patient adherence in the 1970s and 1980s in the United States before anti-inflammatory medication became the standard of care. No direct measures of adherence are available for any of the maintenance anti-inflammatory medications.

In summary, several types of methods are available to evaluate the level of patient adherence. Clinicians will get a “better picture” of what patients are doing with their medication by using more than one adherence measure listed above.¹⁰

BARRIERS AND INTERVENTIONS

Nonadherent patients may be categorized by 3 types of behavior.¹⁰

Erratic patients have difficulty following treatment because of the complexity of treatment or the chaos of their lives. They tend to be forgetful, to be too busy with changing schedules, and frequently run out of medication. Their priorities do not match the requirements to follow the regimen recommend by their provider. The intervention for these patients includes simplification of the regimen, tailoring treatment to a specific daily activity (tooth brushing), and memory aids.^{8,38}

Unwitting patients misunderstand the dosing regimen or forget instructions. They fail to understand the rationale for therapy and do not distinguish acute from preventive therapies. There may be language barriers or health literacy issues. The intervention for these patients is to provide clear communication and to use techniques of shared decision making (SDM) (see Effective Communication Strategies) to verify comprehension.³⁹

Intelligent nonadherent patients frequently believe that they know more about the appropriate treatment than the provider does. They may say that they do not need treatment or it is ineffective; they are concerned about drug dependence, side effects, or addiction; or they have a different cultural belief from the provider. The intervention for these patients is to use motivational interviewing communication skills to identify patient concerns.

Motivational interviewing is a patient-centered counseling approach that can be briefly integrated into patient encounters and is specifically designed to enhance motivation to change among patients not ready to change.³⁹ This communication technique includes asking open-ended questions that make the patient more active in the interview and permits a more accurate history that is directed by the patient. Motivational interviewing helps patients overcome recognized and unrecognized ambivalence to treatment recommendations and enhances patient motivation to change.³⁹

Adherence barriers may also be classified as drug-related, patient-related, disease-related, provider-related, and practice-related, each with their own specific interventions.

Drug-related barriers

Regimen factors that may affect adherence to asthma medication as well as other diseases include duration, frequency, complexity, cost, efficacy, and real or perceived concerns about side effects.¹⁰ Correct use of MDI is key, and incorrect technique may be considered a form of poor adherence. Patients

must also understand when to supplement daily ICS use with use of rescue medication. Patients may not use ICS inhalers because they do not perceive the immediate bronchodilation effect with β -2 agonists.⁴⁰ Interventions for these various types of drug-related adherence barriers are summarized in Table I.

Patient-related factors

According to the World Health Organization, patient-related factors represent the resources, knowledge, beliefs, perceptions, and expectations of the patient.¹⁰ Poverty may lead to decreased access to medication and health care providers. Depression can influence understanding of instructions, beliefs, and expectations about treatment.⁴¹ Age may be a factor that affects adherence. Older persons may forget to take their medicine.⁴² Adolescents may be reluctant to follow medication recommendations because of body image, peer pressure, or autonomy issues.⁴³ Comprehension of asthma care instructions may be a barrier secondary to poor literacy or poor instruction from the provider.⁴⁴

Health beliefs are associated with adherence. Persons who do not believe that the treatment is effective will not follow through with recommendations.⁴⁵ Distrust of the health care provider leads to less adherence.⁴⁶ In asthma, low literacy has been associated with improper use of MDIs.⁴⁴ One aspect of literacy may be particularly important: ability to understand and use numerical concepts. Poor scores on testing of numerical concepts have been shown to be related to ED and hospitalizations.⁴⁷ Patients who are concerned about steroid use may underdose or discontinue long-term use in an effort to be “steroid sparing.”¹⁰ Interventions for the various patient-related barriers are shown in Table I.

Disease-related factors

A primary role of asthma management is to achieve adherence. Unfortunately, the following characteristics of asthma are associated with poor adherence: the disease is chronic, requiring continuous medication administration; there may be periods when patients may be asymptomatic; and a portion of patients with asthma have difficulty appreciating that they have bronchoconstriction that requires treatment.¹⁰ Peak flow monitoring may help demonstrate the need for medication, especially in poor perceivers.⁴⁸

Provider-related factors

Physician communication skills are appreciated by patients and can influence adherence and outcomes.⁴⁹ A significant body of research supports the concept that providers who are friendly and empathetic, have the ability to earn the trust of patients, can relate to the patient at their level of comprehension, and have the sensitivity to assess and overcome patient barriers will have enhanced adherence and outcomes.³⁹

Implementing self-management education programs can influence adherence and outcomes. Successful programs involved self-monitoring of peak expiratory flow rates and symptoms as well as regular medical review and written action plans. Studies of adult self-management programs have shown improved health outcomes: reduced nocturnal asthma, hospitalizations, physician visits, and missed days of school and work.^{50,51} Superior outcomes were achieved for patients with written asthma action plans who had the ability to adjust their medication.^{50,51}

TABLE I. Drug and patient factors affecting adherence to asthma treatment and interventions to address these barriers*

Factors that affect adherence	Interventions to improve adherence
Drug-related factors	
Difficulties with inhaler devices	Identify appropriate device for patient. Demonstrate use and have patient demonstrate technique in turn.
Awkward regimens (eg, 4 times daily) or multiple drugs	Simplify regimen or tailor to patient preference.*†
Fears about side effects	Determine whether concern is theoretical or specific. If specific, help the patient balance the persistence of the symptoms with likelihood of side effects. Use motivational interviewing to assess pros and cons and reduce ambivalence. Consider referral to support group.‡
Cost of medication	If patient has prescription plan, select least-expensive drug. If not, refer to discount pharmacy plans or pharmaceutical assistance programs.§
Dislike of medication	Reduce allergen or irritant exposure to decrease symptoms or medication.¶ Use motivational interviewing to assess pros and cons and reduce ambivalence.‡
Distant pharmacies	Identify capability of receiving prescription by mail.§
Patient-related factors	
Misunderstanding or lack of instruction	If lack of instruction, provide instruction. Assess level of literacy. If low, provide suitable education strategy. Review pathophysiology and rationale for treatment as well as consequences of no treatment. Provide instruction and have patient demonstrate inhaler technique.*†¶
Dissatisfaction with health care professionals	Have patient speak to administrator about issue. May require patient to see another provider if interactions do not improve.§
Unexpressed/undisclosed fears or concerns	Identify concerns and address each. Determine whether they are theoretical or actual. Consider referral to a support group. May require psychological intervention if fears or concerns persist.‡§
Inappropriate expectations	Clarify expectations from a medical perspective. If patient expects greater or quicker improvement, attempt to reset expectations. Review role of allergen/irritant exposure as factor.¶
Poor supervision, training, or follow up	Encourage supervision for children/the elderly. Review use of medication in office. Schedule appropriate follow-up.¶
Anger about condition or its treatment	Identify reason for anger. Express that treatment may improve condition. Assess ambivalence about treatment and review possible alternatives.‡
Underestimation of severity	Relate symptoms with pulmonary function or use exercise challenge to demonstrate severity of condition.¶
Cultural issues	Appreciate that various cultures have different concepts of development of asthma, factors that exacerbate it, and treatment choices. Take advantage of community health workers to clarify issues.¶
Concerns about stigmatization	Assess patient reaction to diagnosis. Understand the patient's concerns and refer to support group if the concerns persist.‡
Forgetfulness or complacency	Determine whether the problem is forgetting to follow treatment or other reasons. Consider tailoring medication use to patient's daily activities. Address complacency by withdrawing treatment to determine actual need for treatment.¶
Attitudes toward ill health	Assess patient's health beliefs about asthma and treatment. For patients who question the diagnosis or efficacy of treatment, consider stopping treatment and having patient monitor lung function at home.¶
Religious issues	Clarify how patient's religious beliefs may affect attitudes about diagnosis and treatment. Discussing this with patient's religious leader may give insight and source of support for the patient.¶

Reprinted from reference 7.

*Data from reference 38.

†Data from reference 8.

‡Data from reference 39.

§Data from reference 31.

¶Data from reference 48.

¶Data from reference 10.

Similarly, Haynes et al⁵² reported that the most effective interventions for patients included providing reinforcement for patients' efforts to change health-related behaviors, giving feedback on progress, tailoring the education intervention to the specific needs of the patient, teaching self-management skills, and providing the patient with educational resources.⁵² Providing patients with feedback about medication use has been shown to be helpful in increasing adherence to asthma therapies and is consistent with the recommendations of Haynes et al⁵² to give feedback on patient progress. Onyirimba et al¹⁵ used electronic monitors on ICS for adult inner city women and found that those who were given feedback about medication use had higher (78%) adherence during the 10-week outpatient study than

women in the control group who received no feedback. Weinstein et al⁵³ used theophylline monitoring in the outpatient phase of an uncontrolled trial of 59 children with severe asthma who were initially treated in a 10-day rehabilitation protocol. Feedback about theophylline use as outpatients was in part responsible for marked reduction in subsequent hospital days, emergency care, and asthma-related cost.

In summary, adherence and outcomes can be improved with the provision of asthma education that includes peak flow monitoring, asthma action plans, and patient-physician agreement to self-adjustment of medications when needed.^{50,51} In addition, providing feedback about medication use to patients when medication use can be tracked can be beneficial.²⁰

Practice-related factors

Studies have shown that the organization and processes of the clinic affects adherence to asthma treatment. Fewer patients seen per hour, longer appointment length, evening hours, multilingual staff, consistency of care, ease of making appointments, ease and effectiveness of telephone communication, and use of telephone calls for reminders and follow-up all promote adherence.⁹ Increasing copays for visits and medication are responsible for nonadherence.⁵⁴

EFFECTIVE COMMUNICATION STRATEGIES

Patient-centered communication strategies have been recently introduced to help patients be more consistent with their medication regimen. Patient-centered approaches are associated with better patient retention, adherence, and treatment outcomes without increased time and cost.⁴⁹ Wilson et al⁴⁹ used a patient-centered counseling approach, SDM, to determine its effectiveness in increasing adherence and asthma control in 612 adults with asthma.⁴⁹ Practitioners in the study were nonphysicians. The focus of SDM is negotiation of a treatment regimen that accommodates patient goals and preferences. During this 2-year study, patients had increased adherence with ICS and LABAs, improved asthma-related quality of life, reduced rescue medication use, greater asthma control and lung function, as well as decreased clinic visits. These findings support the conclusion that negotiating patients' treatment decisions significantly improves adherence to asthma pharmacotherapy and clinical outcomes.

Clark et al⁵⁵ and Cabana et al⁵⁶ have developed effective training programs that combine communication as well as asthma management to assist primary care physicians in caring for patients with asthma. They were able to decrease nonemergency visits and days affected by wheezing, increase patient satisfaction, and improve parent-reported provider communication skills. These results emphasize that the best results are obtained when clinicians negotiate treatment plans with patients to achieve patient buy-in.⁴⁹ When patient ambivalence is identified, patient-centered communication techniques can increase motivation to accept recommended treatment.³⁹

SUMMARY

Adherence to medication is an essential part of asthma care and can be achieved following the 4 sequential management principles presented: diagnosis of patient adherence status, identification of barriers to treatment, application of strategies to address barriers, and use of effective patient-centered communication strategies. Careful attention to these adherence management principles should increase adherence, enhance outcomes, and reduce unnecessary morbidity and cost.

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