

Motivating Patient Adherence to Allergic Rhinitis Treatments

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Abstract Patient nonadherence significantly burdens the treatment of allergic rhinitis (AR). Fewer than half of prescribed doses of intranasal corticosteroid medication are taken. The challenges for immunotherapies are even greater. While sustained treatment for 3 to 5 years is required for full benefit, most patients receiving immunotherapy, either subcutaneous or sublingual, stop treatment within the first year. Although research into interventions to improve AR adherence is lacking, lessons learned from adherence interventions in other chronic health conditions can be applied to AR. Two well-established, overriding models of care—the chronic care model and patient-centered care—can improve adherence. The patient-centered care model includes important lessons for allergy providers in their daily practice, including understanding and targeting modifiable barriers to adherence. Additionally, recent studies have begun to leverage health information and communication technologies to reach out to patients and promote adherence, extending patient-centered interventions initiated by providers during office visits.

Keywords Adherence · Allergic · Rhinitis

Introduction

Two conditions commonly treated by allergists, asthma and allergic rhinitis (AR), share the significant challenge of patient nonadherence. In the treatment of asthma, fewer than half of prescribed medications are taken. For new asthma controller

medication prescriptions, over 25 % are never filled [1], a problem labeled primary nonadherence. Even among those who fill their medication, half fail to return to refill within a year [2], indicating medication abandonment. In a report of medication use in 2.7 million patients, discontinuation rates were particularly problematic in the 41.6 % of patients with asthma who stop refilling after a single, initial fill [3•]. Discontinuation rates are also high in other disease categories; 39 % of patients with hypertension [4] and 86 % of patients with COPD [5] ceased refilling their medication and did not return to fill again within a year. As asthma controller medication adherence declines, patients experience increased symptoms [6], emergency department visits, hospitalizations, and death [7•, 8, 9].

Allergic Rhinitis Treatment Adherence

Because fewer adherence studies have been reported in AR treatments than in other chronic health conditions, the problem of nonadherence in AR is less well defined. This is likely the case for several reasons including the fact that many AR treatments are taken as needed, making adherence difficult to define without a daily prescribed dose. Additionally, many patients take over-the-counter medications for AR without consulting a physician, and researchers may not view AR treatment nonadherence as a sufficiently serious concern to warrant investigation. Hence, little information is available on antihistamine adherence. However, because intranasal corticosteroids are a prescribed daily treatment, nonadherence to INS has received some attention. For example, in a report based on refill patterns in 585 AR patients, chlorofluorocarbon-propelled pressurized metered-dose inhaler adherence was 53.2 % and aqueous intranasal corticosteroid adherence was 32.7 % [10]. These findings are similar to mean inhaled corticosteroid adherence rates of 34 % in adults

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[11] and 40 % in children with asthma [12]. Rejection of intranasal corticosteroid therapy has been attributed to after-taste, nose and throat irritation [13], side effects [14], and cost [15].

Immunotherapy Adherence

Adherence to immunotherapy has received greater attention than other AR treatments, both because it is prescribed at specific intervals and because benefits are dependent on long-term adherence. Following initial positive but biased reports of high adherence to immunotherapies based on patient testimony, studies based on refill data—a more objective and reliable long-term measure of adherence—produced a much less encouraging picture. The bulk of evidence indicates that 3 to 5 years of sustained immunotherapy is required for full, long-term benefits [16•], but fewer than half of patients on immunotherapy persist to that point. Early discontinuation translates to minimal or lost gains in control of AR. Hence, while partial adherence to intranasal corticosteroids yields benefit as long as they are being administered, the cost and effort of immunotherapy are difficult to justify in the face of poor adherence.

The introduction of sublingual immunotherapy (SLIT) creates greater convenience for patients but has not improved treatment adherence over subcutaneous immunotherapy (SCIT). Large pharmacy refill database studies, which yield the most accurate estimates of immunotherapy adherence, have shown that 53 % of SCIT patients discontinued treatment in the first year with fully 84 % discontinuing by year 3 [17]. Similarly, 56.3 % of SLIT patients discontinued in year 1 and 86.8 % by year 3 [18]. In one side-by-side comparison of immunotherapy patients, 77 % on SCIT and 93 % on SLIT discontinued before reaching 3 years [19•].

Why Are Patients Nonadherent?

Health-care providers frequently report frustration over the nonadherence of their patients. Providers may follow current evidence-based guidelines and prescribe medications that can improve patients' lives and prevent dangerous and costly exacerbations, yet more frequently than not, patients fail to follow their treatment plan and many completely abandon their treatment. The problem is not limited to AR and asthma; for example, adherence is often poor in the treatment of hypertension [20], hyperlipidemia [21], chronic obstructive pulmonary disease [22], and diabetes [23]. Collectively, nonadherence across chronic health conditions is estimated to result in 125,000 deaths and \$300 billion in excess health-care costs annually [24–27]. Against this background of enormous consequence, numerous efforts have been made to improve

adherence. Many have failed, often because the intervention was initiated without understanding the root cause. Nonadherence does not occur for any single reason, but rather a complex set of reasons that vary across individuals.

Two helpful delineations of the causes of nonadherence separate them into dichotomous categories. The first distinguishes between the *modifiable* and *nonmodifiable* predictors of nonadherence (Table 1) [28–30]. The implication of separating modifiable from nonmodifiable predictors is to bring focus on those factors that health-care providers can impact. These include choice of medication and consideration of the individual circumstances of patients, including their beliefs, knowledge, and family support. The second delineation of the factors leading to nonadherence separates *intentional* and *unintentional* nonadherence (Table 2) [31, 24, 32]. Unintentional nonadherence occurs where patients forget to take their medication or misunderstand instructions, but most nonadherence is intentional and the result of a patient or parent decision not to take the medication [24]. The two delineations together help guide the direction of adherence interventions. Many of the modifiable factors in Table 1 play into patient decision-making and lead to the intentional nonadherence in Table 2. Patients require information and education, but even a well-informed patient may decide to discontinue their AR medication because of cost, inconvenience, or the belief that medication benefits should be immediately perceivable or that long-term use brings unacceptable side effect risks [33, 34]. Further, patients whose family or friends do not support adherence, for example in the form of a spouse critical of the use of the AR medication, are more likely to become discouraged and discontinue treatment [35].

Changing Adherence Behavior

Improving AR adherence must involve addressing at least some of the barriers that result in unintentional and intentional nonadherence. No intervention can address all barriers, and even simple interventions may improve adherence in some patients. Such *low hanging fruit* interventions might include sending automated reminders to patients who do not pick up a newly prescribed medication. For example, a study of 5216

Table 1 Predictors of nonadherence

Nonmodifiable predictors	Modifiable predictors
Race	Medication regimen complexity
Socioeconomic status	Patient health beliefs
Medication cost	Patient knowledge
Treatment duration	Family support
Access to care	Provider communication skill

Table 2 Intentional and unintentional nonadherence

Intentional nonadherence	Unintentional nonadherence
Patient decides whether to take the medication	Nonadherence is unintentional
Patient may consider cost, side effects, and outcome expectations	Possible causes may include misunderstanding and lack of information
Patient decision is guided by previous experience and health beliefs	Interventions primarily involve giving information and instruction
Interventions must engage patients in examination of their decisions	

patients within Kaiser Permanente of Southern California tested an automated telephone call to remind them to fill their hyperlipidemia prescription, followed a week later by a reminder letter if the call did not result in a medication fill. Those who received an automated reminder were 1.6 times more likely to fill prescriptions for cholesterol-lowering statins than those who did not receive a reminder. This relatively simple intervention costs \$1.70 per patient and resulted in a 61 % increase in the number of patients completing the medication fill [36]. While appealing, such brief, automated, low-cost interventions will be insufficient to change behavior in many patients. The most effective interventions that can activate patients toward improved management of their condition depend on effective provider communication skills. Two models of care, patient-centered care and the chronic care model, provide frameworks for such effective adherence enhancement strategies.

Patient-Centered Care

Care that aims to consider patient perspectives and involve patients in making decisions about their own health can lead to improved adherence and illness outcomes. Providers may assume but do not always know what matters most to patients and family members and may proceed to make decisions that they perceive to be in the best interest of the patient without solid understanding of the patient's needs, desires, and preferences. When providers can effectively engage patients in shared decision-making, patients report more satisfaction, greater involvement in their care, improved adherence, and lower health-care utilization. For example, a study of patient-centered care randomly assigned providers of adults with asthma ages 18–70 to usual care, guidelines management training, or shared decision-making (SDM) training, which included training in both guideline management and communication strategies that promote greater involvement of the individual patient in deliberations about treatment options. Patients of providers who received the SDM training

demonstrated dramatically higher adherence and decreased urgent care use [37••].

Chronic Care Model

The chronic care model (CCM) is a framework for improving care of chronic health conditions. This approach often attempts to incorporate evidence-based patient-, provider-, and system-level interventions. A Cochrane Collaboration review concluded that practice change in four categories led to the greatest improvement in health outcomes: educating patients, improving provider knowledge and skill, adopting a more team-based and planned approach, and better capitalizing on health information systems [38]. For example, a cluster-randomized study of diabetes care tested a CCM intervention in 40 primary practices randomized to 6- or 18-month practice facilitation interventions or a control group receiving only information but not practice design guidance. Measures of diabetes care improvement showed greater change in the practice facilitation providers over the control practices [39]. Applications of the CCM can also improve adherence. An adherence intervention program conducted through 170 Belgium pharmacies was built on a multidisciplinary collaboration designed to improve care of COPD that included educating patients and communicating with primary care providers. The intervention resulted in an increase in adherence and decrease in cost per patient relative to usual care patients [40].

Adopting Cost-Effective Adherence Interventions in Allergy Practice

While the patient-centered care and chronic care models have established an evidence base for improved care, adherence, and outcomes, it is not clear that every intervention is cost-effective or practical for adoption into allergy practice. For providers treating patients with symptoms limited to allergic rhinitis, adopting organizational-level, chronic care strategies that were developed largely with life-threatening conditions such as diabetes and cardiovascular diseases may seem like an excessive investment in resources. However, for patients with multiple conditions such as asthma, allergies, and gastroesophageal reflux, the challenges of maintaining optimal control and treatment adherence easily justify development of interventions that include organizational changes, assessment and monitoring, care planning, self-management support, and provider collaboration. These chronic care strategies can improve adherence and reduce exacerbations in patients with asthma and allergies [41].

If the chronic care model requires change at an organizational or health-care system level, patient-centered care reflects change at the provider level. Delivery of patient-

centered care requires commitment of the provider to employ communication strategies that can lead to behavior change. Given that provider time is often a limited resource, adoption of time-efficient communication strategies may be particularly important. Some behavior change interventions may require that providers spend considerable amounts of time talking with patients. Although interventions that require more provider time and effort and contain more components have yielded greater adherence change (Fig. 1), committing large amounts of provider time to behavioral interventions may not be practical. For example, motivational interviewing (MI) is a counseling technique that aims to engage the patient's intrinsic motivation to change health-related behavior. While MI is an effective communication strategy leading to behavior change, randomized trials using MI have typically required from one to five hours of MI to increase physical activity [42], decrease alcohol use [43, 44], or improve adherence to glaucoma [45] or schizophrenia medication [46]. Such time commitments are not feasible in most clinical settings.

Fortunately, recent work has focused on developing time- and resource-efficient approaches to patient-centered care that can enhance patient motivation, activation, and adherence [47, 48]. An effective model for evidence-based, patient-centered strategies that can be adopted into even short office visits to improve adherence includes the following five elements [49]:

Build a Relationship

Patients are more likely to follow recommendations when they like and trust their health-care provider. First impressions are a powerful factor in trust development; patients quickly form opinions of their provider at the first visit, and trust is more likely to occur when that interaction begins with a provider who is warm and friendly, expresses genuine interest in the patient's problem, and does not seem hurried. Small behaviors from the provider that shape these impressions include

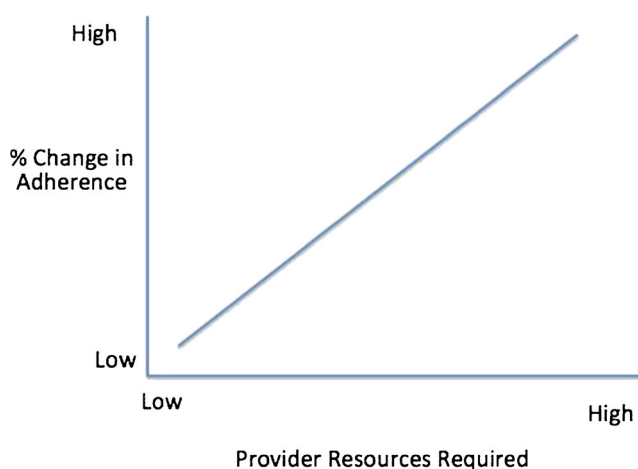


Fig. 1 Relationships between provider resources and adherence change

voice tone, smiling, eye contact, and other nonverbal communications [50]. When providers present as supportive, understanding, and nonjudgmental, patients express greater satisfaction and are more likely to be adherent to treatment [51, 52].

Focus on Listening

Effective communication begins with effective listening. Many providers are comfortable giving information but may not be as skilled at listening. Further, time pressures often produce a need to move quickly through the encounter, increasing the tendency to speak rapidly and reduce the listening time. In patient-centered care, the provider listens carefully to the patient, allows sufficient time for the patient to share their primary concerns and what they hope to accomplish in the visit, verifies to be sure that the provider has correctly understood the patient, and addresses the patient's concerns during the visit. Two motivational interviewing techniques can greatly assist in this process. These include asking open-ended questions, i.e., questions that allow the patient to tell their story and cannot be answered with *yes* or *no*. The second is reflective listening, which involves stating back to the patient what the health-care provider believes they have heard from the family to ensure correct understanding of patient and family perspective. These patient-centered strategies, which can improve treatment adherence [53], can be applied to patients with allergic disorders.

Provide Information

Patients are unlikely to be adherent to their AR treatment unless they have a clear understanding of their illness and the treatment, including correct expectations about treatment cost, duration, benefit, and potential side effects. Patients who are confused or doubtful about their treatment are likely to stop taking it [54]. In turn, when patients are provided with the knowledge and skill to self-manage their illness, they will be more adherent [55].

Collaborate on the Treatment Plan

Patient-centeredness presumes that the provider will avoid adopting a paternalistic approach in which the patient is told what is wrong with them and what they need to do and instead work toward a partnership in which the patient is heard, a discussion occurs, and the two parties agree both on the goals of treatment as well as the treatment itself [56••]. In the treatment of AR, much provider focus has been directed at choosing an effective medication based on the patient's history and symptoms [57] in a process that can be provider-centric while failing to determine what the patient would prefer. Although providers are often directed to consider patient preferences,

for example by asking patients whether their willingness to use a specific AR medication would be impacted by the medication's cost [15], odor, or taste [58], such approaches do not fully embrace patient-centeredness. Adherence is most likely to improve when patients are engaged in a process of shared decision-making where the provider attempts to reach concordance with the patient about treatment choices and goals, promoting greater involvement of the patient in deliberations about treatment options [59, 60]. This approach recognizes that patients make active decisions about whether to continue taking an AR medication [31] and that patient involvement in that decision-making process is more likely to lead to treatment commitment [31].

Follow up

Once a patient leaves the clinic, providers have limited opportunity to influence patient behavior. Still, if effective communication in the office has set the stage for enhancing adherence, subsequent contact can reinforce this motivation. Follow-up communication may occur during return visits to the clinic, telephone calls, and other technology-based interventions. Patients are frequently scheduled for a return visit to help evaluate treatment response. These visits also provide an opportunity for follow-up discussion about the patient's perceptions regarding the treatment and to address any new questions or concerns that may interfere with adherence. Patient support through follow-up telephone calls, letters, and a combination of the two can have a positive impact on patient adherence [61, 62]. Communication and health information technology have been recently employed to provide follow-up enhancement of adherence without requiring additional provider time. Such adherence-enhancing approaches include leveraging text messaging [63] and interactive voice recognition technology [64, 65] to activate patients and encourage better disease self-management. In a recent study that utilized the electronic health record to identify children with asthma whose parents were not refilling their inhaled corticosteroid medication, those randomized to a computerized speech recognition intervention were 25 % more adherent to ICS than usual care families who did not receive a computer-generated call [66]. Another study applied short messaging service texts to adherence with AR treatment; self-reported adherence in the group receiving text messages doubled that of controls [67].

Conclusions

Patients are markedly nonadherent with AR treatments just as they are in the treatment of other diseases. However, nonadherence to AR treatments is less well understood and presents a somewhat different picture than other conditions

because (1) many AR treatments are taken as needed, making adherence difficult to define; (2) many patients treat themselves with over-the-counter medications without consulting a physician; and (3) investigators more interested in life-threatening conditions may perceive AR treatment nonadherence as less important to study. For these reasons, understanding of AR nonadherence and effective interventions to address it has lagged behind other conditions. Nonetheless, strategies tested in other health conditions, including the chronic care model and patient-centered care, can be applied to AR adherence. In the daily practice of allergic medicine, effective brief communication techniques can help address modifiable adherence barriers and consequently improve adherence to AR treatments. Additionally, recent advances in communication and health information technology have created new opportunities to identify and reach out to patients with mobile communication devices, not to replace patient-centered care but rather to help address adherence in follow-up to the care received from the provider during the office visit.

Compliance with Ethics Guidelines

Conflict of Interest Bruce Bender declares that he has no conflict of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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- Of major importance

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