



Understanding and Improving Treatment Adherence in Pediatric Patients

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Many common skin diseases of children are easily diagnosed by dermatologists and have straightforward treatments. Nevertheless, sometimes these conditions are frustratingly difficult for both patients and physicians to control. Poor adherence to treatment may be the underlying cause of poor outcomes in many situations. Studies of pediatric patients' use of medication show poor use across a broad array of medical illnesses. Studies of adherence in children with acne and atopic dermatitis show similar findings. The reasons for poor adherence likely vary across the pediatric age range, with fears of side effects being pre-eminent in the care of infants and interpersonal interactions playing a greater role in adolescents. By recognizing the major hurdles to adherence across the different ages, dermatologists may be better able to tailor interventions to improve the outcomes of children with skin disease.

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Common skin diseases of children—atopic dermatitis and acne—are not difficult for dermatologists to diagnose. Knowing what medications to use for these conditions falls within the realm of basic dermatology. Yet these conditions can be frustrating, not only because of their impact on patients' and families' lives, but also because of the spotty effectiveness of treatment. Much of the poor response observed with topical treatment of these conditions may be caused by poor adherence to a medication's instructions for use.

Treatment adherence is the extent to which a patient's medication use behavior is consistent with health-care recommendations. Poor adherence is common in children with chronic diseases; estimates suggest approximately 30% of children with chronic disease are nonadherent to treatment recommendations.¹ Recent studies of compliance with topical treatment in children with atopic dermatitis and acne confirm that poor adherence is a nearly ubiquitous phenomenon.^{2,3}

Poor adherence compromises the effectiveness of drug treatments, leading to treatment failure;⁴ thus, dealing with

medication nonadherence is essential. Medication adherence has been studied in many pediatric conditions, such as asthma, diabetes, and epilepsy, as well as in children with atopic dermatitis and acne. This article first provides a brief overview of medication adherence in children. We then focus on the relationship between poor medication adherence with age and suggest potential age-specific strategies that can be applied to improve adherence in children. Our goal is to raise awareness of the issues related to nonadherence in children and provide practical advice for enhancing adherence behaviors in children.

Pediatric Medication Adherence: A Brief Overview

Nonadherence is a major hurdle to managing children with skin conditions and other diseases. In pediatric patients, medication adherence rates range from 11% to 93%, with a median rate of 58%.⁵ The implications of poor adherence in clinical practice are widespread, and the economic burden to both society and families is immense.⁶ Poor adherence may result in increased disease symptoms, decrease in physical functioning, increased time in the hospital, increased health-care costs, and increased rates of morbidity and mortality.^{7,8} In patients with asthma⁹⁻¹¹ or diabetes,¹² nonadherence may result in repeated emergency department visits or intensive care admissions and in severe morbidity and/or mortality. In dermatology, poor adherence is primarily evidenced by treatment failure.^{13,14} In children with atopic dermatitis, poor

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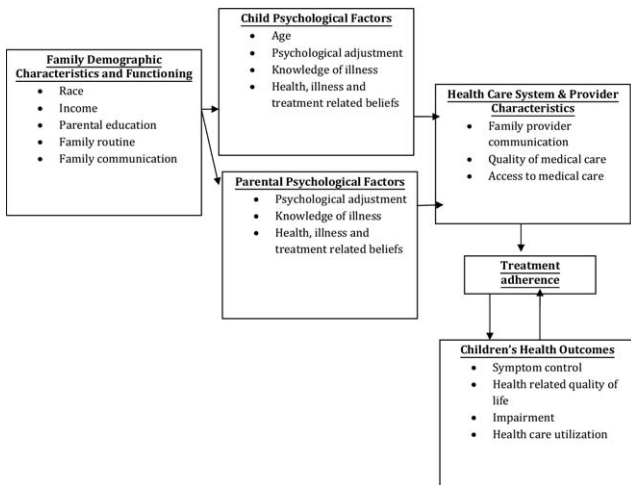


Figure 1 Conceptual model of influences on adherence to pediatric treatment.¹⁵

adherence may be the primary reason for failure of topical corticosteroid treatment, which may lead to use of potentially toxic systemic medications.³ Moreover, overuse of medication—the other extreme of poor adherence—may result in undue toxicity.

Many factors affect pediatric patients' use of medications.^{15–17} These factors can be grouped into the following categories: (1) family demographic characteristics and functioning; (2) parent characteristics; (3) child characteristics; (4) health-care system and provider variables; and (5) child health outcomes (Fig. 1).^{15–18} For practical purposes, factors over which physicians have control are the most important and relevant to clinical practice.

Poor Adherence in Children Varies With Age

Typically younger children are more adherent than adolescents, a consistent finding across many pediatric conditions, including asthma,¹⁹ diabetes,^{20,21} anxiety disorders,²² and HIV.²³ The reasons why adherence varies with age are not well characterized. Two factors that are necessary for appropriate medication use, cognitive understanding of illness and responsibility for illness management, are positively related to age.¹⁹ Among children with asthma, both factual knowledge and conceptual reasoning about asthma were associated with age; as children grow older, they accumulate knowledge and gain an increased ability to reason about illness. Nevertheless, older children tend to be less adherent to their treatments.

As children mature, they assume more responsibility for self-management.¹⁹ Parents can apply medication on a poorly mobile, relatively weak, infant fairly easily. Young children are a moving target and harder to contain. In this age group, it may be much more difficult for parents to apply topical corticosteroids to their child with atopic dermatitis than it would be if the child were an infant. Adolescents, however,

are downright oppositional and may be largely responsible for their own treatment.

Older children may be less able or motivated to care for their illness, independent of their knowledge and understanding of the illness. First, with less supervision, the child may simply be less able to remember to take drugs appropriately or on schedule. In addition, children who have started to be responsible for their own disease treatment may attempt to “test out” the efficacy of certain medications by cutting back or eliminating doses without knowledge of their parents. As social relationships develop, adolescents may choose not to take medications in certain situations as the result of social barriers. Younger children may be less embarrassed to make a quick visit to the nurse for medication, whereas a teenager might not want to leave the lunchroom for fear of “standing out.” Moreover, older children's own beliefs regarding costs and benefits of appropriate medication use may have a bearing on adherence behavior as they assume more responsibility for disease management.

Two beliefs about medication adherence have been found to be important in adult patients' medication taking behavior: patients' concerns regarding medication use and patients' estimate of medication necessity.²⁴ When patients' concerns about medication use exceed their estimate of medication necessity, poor adherence results. For older children who start managing their own disease treatment, their own beliefs about medication need and concerns about medication use may be more important predictors of adherence behavior than parental beliefs. In the face of little immediate benefit from medication use, and because of less concern about their condition than their parents have, adolescences may simply choose not to take their medication. This reminds us of some of our acne patients!

Although omission of a dose because of forgetfulness tends to be the most common form of nonadherence,²⁵ it may be helpful to categorize the most common other reasons for poor adherence as a function of age. We consider 3 age groups—infants, young children, and adolescents. The characteristics of children's lives and behaviors at these ages likely affect why they may be nonadherent to treatment.

In infants, parents or caregivers are primarily responsible for disease management (Table 1). Parents' or caregivers' fear of adverse effects, their general beliefs about medications, and caregiver availability are likely to be key factors affecting adherence. As children become more autonomous, parents/caregivers are still likely to be primarily responsible for applying treatment, but other factors become important. Time spent at school may affect the times at which treatment is feasible. Busy lifestyles and the tendency for young children to run away at inopportune moments may make adherence more difficult.

The psychology of adolescence adds further difficulties. Adolescents' tendency toward oppositional behavior may make them less likely to use medications when they feel harassed by parents. In addition, adolescents have a strong tendency to want to be like other adolescents; this may hamper adherence in adolescents who feel that using medication will make them different from their peers.

Table 1 Common Reasons for Poor Adherence in Different Pediatric Age Groups

Age	Common Reasons for Poor Adherence
Infants	Fear of adverse effects Caregiver availability General beliefs about medications
Young children	Burden of using treatment (chasing kids down, time management)
Teens	“Normative” behavior (wanting to be like other teens) Desire for independence/oppositional behavior (perceived parental harassment)

Other common issues affecting adherence in children of all ages include forgetfulness, thoughts that the medication is ineffective, and messiness of treatment.

Strategies for Improving Adherence in Different Pediatric Age Groups

Although studies in adults of interventions to enhance adherence have shown that improvements are modest at best and do not necessarily affect treatment outcomes, there has been little research on the most effective methods for improving medication adherence in pediatrics.

In general, both behavioral and educational strategies for improving adherence are recommended. Identifying potential barriers and trying to overcome them by involving both children and their parents or caregivers in the treatment planning process are recommended. Tailoring the treatment regimen to the child and family’s lifestyle should be taken into account.²⁶

We have suggested that one valuable tool for improving adherence in the pediatric dermatology population is the Written Action Plan (WAP).^{27,28} WAPs have been used to help improve treatment options in children with asthma. Like asthma, atopic dermatitis is a chronic condition for which treatment varies over time. WAPs give patients/caregivers a written plan to guide evaluation of the disease and to direct management options based on disease severity. This provides the patient/caregiver a sense of “therapeutic partnership” with the dermatologist as well as a degree of autonomy and control over disease management.

We believe that it may be helpful to base interventions to improve adherence in the pediatric dermatology population on the key factors that affect adherence at different ages (Table 2). Parents—particularly new parents—may be terrified of the risks of medications for their new infant. In this setting, measures to reassure parents of the safety of the medication may be most important. Choosing medications that have excellent safety profiles is a start. Moreover, giving parents’ confidence in those treatments may also be essential. Although the risks must be discussed, it is important to put risks into perspective. It may be best not to use words like “steroid” that carry the baggage of connotations very different

from the actual medication being used. Instead, terms that more accurately describe the medication, like “topical anti-inflammatory,” can be used. Giving parents of infant patients a return appointment shortly after starting a topical corticosteroid may also drive adherence behavior for several reasons. First, the short time horizon makes the chance of an adverse event highly unlikely. Second, it is easier to comply for a short time than for a longer period. Third, coming in for an office visit drives patients to be adherent, the so-called “dental floss phenomenon.”²⁹

As children grow older, life becomes more hectic with school and recreational activity. The return visit is still a critical factor, with the short time horizon making it seem less burdensome to maintain a good level of adherence. To address the short time a parent may have with a child before the child runs away, easy-to-spread vehicles may be valuable. These vehicles should be products that do not sting because the young child may have little tolerance for acutely irritating products. Positive reinforcement is a potent driver in this population. The use of sticker charts is an easy, inexpensive strong motivator. The sticker chart consists of a calendar and some stickers. The child is given a sticker each time he or she applies the medication (or holds still long enough for mom or dad to do the application). Children will jump through flaming rings (or even better, use the potty) for a sticker!

Ensuring that adolescents use their medication regularly may be one of the most important aspects of acne treatment and a key skill in dermatology. Dermatologists should recognize that adolescents are typically trying to fit in and be like other adolescents. Telling teens that most teens with acne are noncompliant is not likely to be an effective way to get teens to use their medications. Instead, teens might be told, “this is the medication that most teens are using to get their acne better.”

Table 2 Strategies for Improving Adherence in Different Pediatric Age Groups

Age	Strategy to Improve Adherence
Infants	Choose safe treatments and emphasize their safety Schedule a return visit shortly after starting treatment to reinforce and reeducate caregivers
Young children	Provide a short time horizon before the first follow up visit or phone call contact Choose an easy-to-apply, nonirritating vehicle Use a sticker chart to give the child positive reinforcement for adhering to treatment
Teens	Let the teen know you are prescribing products that “other teenagers (especially the really cool ones) are using” Give the teen independence and responsibility for their treatment

Control issues between adolescents and their parents may need to be addressed. A teenager may not be using the medication because the parents are telling the teenager to use it. In such situations, it may be best to give teenagers control of the medication and to ask parents gracefully to give their child space to do so. Giving the teen a "cue to action," like putting the medication on top of the toothbrush or pillow, may help reduce forgetfulness as a cause of poor adherence.

Conclusions

Skin barrier function is lower in children than in adults. Topical medications should be highly effective in the pediatric population. Poor adherence limits that efficacy. It is critical that physicians understand that they may have much control over patients' adherence behavior. Employing strategies to improve adherence can improve both the speed and consistency of dermatologic treatment.

Because each patient presents unique characteristics and preferences, dermatologists must be investigators with respect to patients' and caregiver's adherence behaviors. In the face of treatment failure, automatic prescription of stronger and stronger medications and moves up the therapeutic ladder may not be warranted. Efforts should instead be made to try to identify why the regimen is not working and to discern what it is about the recommended regimen that is bothersome to patient, parent or family. Treatment outcomes can be poor because of fears of safety, unacceptable vehicles (greasy ointments), and inconvenience, or perhaps, though we think this less likely, actual physiological resistance to the recommended treatment. Skill in addressing these practical aspects of treatment is part of the art of dermatology. Pediatric dermatology gives us an opportunity to practice and refine that art, to the benefit of the patient, over a broad range of characteristics and behaviors of both pediatric patients and their caregivers.

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