
In Brief

C. Everett Koop, MD, said, “Drugs don’t work in patients who don’t take them.” There is a lot of evidence that patients are not taking their medications as prescribed. Lack of medication adherence contributes to poor patient outcomes and billions of health care dollars spent unnecessarily. This article reviews medication adherence in the United States, common reasons for lack of adherence, and strategies for improving medication-taking in patients.

Promoting Medication Adherence in Older Adults . . . and the Rest of Us

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Taking medications as directed seems like such an easy thing, doesn’t it? Pop a pill in your mouth, and swallow it down with some water. So much easier than adhering to a meal plan or exercising, right? Unfortunately,

not. Although 1.47 billion new and renewed prescriptions were dispensed in the United States in 2007 at a cost of \$286.5 billion, research has shown that people are not taking their medications as directed.^{1,2} And this is

despite the fact the prescription medications undergo a rigorous approval process to prove their safety and efficacy. Table 1 lists some medication adherence statistics.³⁻⁵

Several studies have been published looking specifically at medication adherence in people with diabetes. A recently published systematic review reported that adherence rates to diabetes medications varied from 31 to 87% in retrospective studies and from 53 to 98% in prospective studies.⁶

Difficulty with taking medications as prescribed can occur in anyone. Research has shown it affects both males and females of all ages and across the spectrum of education and socioeconomic status. Often, difficulty with taking medications has been thought to be a problem seen primarily in older adults; however, age itself has not been identified as a risk factor for medication nonadherence. The results of one study found that patients who were more likely to be nonadherent were actually < 65 years of age and had fewer comorbidities.⁷

Although age is not a risk factor for medication nonadherence, older adults are more likely to have chronic illnesses and to take more prescription medicines. Forty percent of older adults take five or more prescription medications a day.⁸ Additionally, the number of older adults in the United States is increasing at a rapid rate. In 2007, people ≥ 65 years of age comprised 12.6% of the U.S. population. The U.S. Census Bureau estimates that number will increase to 20% by 2030.⁹

Benefits of Medication Adherence in People With Diabetes

Those who care for people with diabetes are well acquainted with the value of medications in the treatment of hyperglycemia, hypertension, hyperlipidemia, and other comorbidities and complications associated with diabetes. A study published by Pladevall et al.¹⁰ found that nonadherent people with diabetes had significantly worse clinical outcomes than those who were more adherent.

Consequences of Nonadherence in People With Diabetes

Table 2 lists some of the consequences that can occur when people do not take their medications.¹¹ We know that poor medication adherence reduces the likelihood of patients achieving clinical targets. In people with diabetes, this is

Table 1. General Medication Adherence Statistics³⁻⁵

- Patients with chronic diseases normally take only 50% of prescribed doses.
- Twenty-two percent of patients take less than what is stated on the label.
- Twelve percent of patients do not fill their prescription at all.
- Twelve percent of patients do not take medication at all after they buy the prescription.

a big consequence. Nonadherence can lead to poor blood glucose control, which can then lead to diabetes-related complications, reduced functioning, lower quality of life, and premature death. Patients with hypertension who take < 80% of their antihypertensive doses have a fourfold increased risk of a cardiac event.³ A recently published study identified two factors—taking diabetes medication doses more than twice daily and the ability to read the diabetes medication prescription label—as significantly related to A1C in those with poorly controlled diabetes (defined as an A1C of > 9%).¹²

Poor Medication Adherence is a Serious Public Health Issue

The National Council on Patient Information and Education (NCPPIE) is a coalition of > 125 organizations whose mission is to stimulate and improve communication of information on appropriate medicine use to consumers and health care professionals.

In August 2007, NCPPIE published “Enhancing Prescription Medication Adherence: A National Action Plan,” which can be accessed online at www.talkaboutrx.org. The 36-page action plan was written by a group of 11 advisors from leading professional societies, voluntary health organizations, and patient advocacy groups. It assesses the extent and nature of poor medication adherence, its health and economic costs, and its underlying factors, as well as the status of research funding. This action plan lists 10 recommendations for improving medication adherence (Table 3).¹³ All health care professionals should be aware of this action plan and be working to improve medication adherence in their patients.

Common Factors Contributing to Medication Adherence

Research on medication adherence has focused mainly on uncovering the barriers to adherence. Table 4 lists some common factors that affect medication adherence.¹⁴ The NCPPIE action

plan categorized the factors underlying nonadherence as patient-, medication-, prescriber-, and pharmacy-related. One or all of these factors can contribute to patients’ ability to take medications as directed.

Patient-related factors

Many patients do not take medications as directed simply because they forget. Often, patients do not take medications correctly because they do not understand the directions on the prescription labels. Health literacy is defined as the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions. Problems with health literacy affect millions of people in the United States, including older adults. More than 77 million adults in the United States have basic or below-basic health literacy skills.¹⁵

Many patients consciously choose not to fill a prescription, not to take their medicine as prescribed, or to discontinue therapy.¹³ These choices are influenced by a number of factors related to patients’ experiences, perceptions, and understanding about their disease and can include:^{13,16}

- Perceptions about the nature and severity of their illness
- Denial of illness and the need to take medicines
- The assumption that once the symptoms improve or people feel better, they can discontinue use of the medication
- Limited appreciation about the value of medicines when properly used
- Beliefs about the effectiveness of the treatment
- Acceptance of taking medications for preventive purposes and for symptomless conditions (e.g., statins to lower blood cholesterol levels)
- Worries about the social stigma associated with taking medicines
- Fear of side effects or concern about becoming drug dependent

Table 2. The Impact of Nonadherence to Medication Regimens¹¹

Medication nonadherence is responsible for:

- 33–69% of medication-related hospital admissions
- 23% of all nursing home admissions
- \$100 billion in direct and indirect costs
- Increased use of expensive, specialized medical resources
- Unneeded medication changes
- Unexplained treatment failures
- Repeat office visits

Table 3. Recommendations for Improving Medication Adherence from the NCPIE Action Plan¹³

1. Elevate patient adherence as a critical health care issue.
2. Agree on a common adherence terminology that will unite all stakeholders.
3. Create a public/private partnership to mount a unified national education campaign to make patient adherence a national health priority.
4. Establish a multidisciplinary approach to adherence education and management.
5. Immediately implement professional training and increase the funding for professional education on patient medication adherence.
6. Address the barriers to patient adherence for patients with low health literacy.
7. Create the means to share information about best practices in adherence education and management.
8. Develop a curriculum on medication adherence for use in medical schools and allied health care institutions.
9. Seek regulatory changes to remove roadblocks for adherence assistance programs.
10. Increase the federal budget and stimulate rigorous research on medication adherence.

Table 4. Common Factors Affecting Medication Adherence^{6,14}

- Regimen complexity
 - Dosing frequency greater than twice a day
 - Remembering doses and refills
 - Depression
 - Adverse effects or fear of them
 - Lack of belief that the medication will help
- Fear of needles and the need for self-injections
 - Lack of confidence in the ability to follow the medication regimen
 - Media influence regarding safety or risk issues associated with particular medicines
 - Lack of positive motivations and incentives to make necessary changes in behavior

Another key factor affecting medication adherence, especially for older adults, is cost-related issues. Studies have shown that older adults skip doses, reduce doses, or do not get prescriptions filled because they cannot afford to pay for medications.¹⁷ Madden et al.¹⁷ recently examined the changes in cost-related medication nonadherence after implementation of the Medicare prescription drug benefit and found a small but significant

decrease in medication nonadherence related to cost.

A recently published meta-analysis on depression and diabetes treatment nonadherence found, not surprisingly, a significant association between depression and treatment nonadherence in people with diabetes.¹⁸

Medication-related factors

Complex medication regimens are a significant barrier to medication adherence. The use of multiple medications (polypharmacy) is often required and beneficial in helping patients with diabetes achieve optimal blood glucose, blood pressure, and lipid control and manage other diabetes-related complications and comorbidities. It is not uncommon for a patient with diabetes to be appropriately prescribed five or more medications.

Concern about medication side effects is another barrier. A 2005 survey of 2,507 adults found that 45% of the respondents did not take a medication because of concerns about side effects.¹³

Prescriber-related factors

In looking at medication nonadherence, the most significant factors related to the prescriber are lack of time and poor communication skills. A search of the literature regarding communication between prescribers and patients regarding medication use reveals some interesting information. One study examined the concerns of older adults with diabetes about the complexity of their medication regimen and whether they discussed medication-related concerns with their physician. One of the findings was that many older adults did not think it was appropriate to discuss their concerns about medication costs with their physician or doubted that chronic illness medications were necessary at all.¹⁹

Another study of medication adherence in the senior population reported that up to 40% of the 17,000 patients surveyed reported some type of medication nonadherence, and 35% reported cost as a reason. Many who decided to skip doses or stop taking their medicine as a result of cost did not tell their prescriber. However, researchers found that patients who talked with their physician about cost-related concerns were more likely to be switched to a lower-cost medication.²⁰ Piette et al.²¹ found that reasons patients give for not discussing medication-related issues with their provider include patient embarrassment, not thinking the topic was important enough, lack of trust, and lack of time during the clinical encounter.

In their article titled, “The Language of Medication Taking,”²⁴ Steiner and Earnst write that, “Medication-taking is a prototype for many behavioral issues in medicine, such as dietary modification, smoking cessation, and exercise prescription. Terms like compliance and adherence are too facile to describe these complex behaviors. They should be replaced with a language that is less succinct but richer in its description and analysis of human behavior. We must assess what our patients are doing and understand why they do it if we wish to help them change. In this effort, our language is

Table 5. Strategies to Improve Medication Adherence^{3,13}

Barriers	Possible Strategies to Overcome
Patient-related issues	
<ul style="list-style-type: none"> • Forgetting due to busy schedule • Difficulty taking multiple medications • Misunderstanding or denial of disease • Failure to see treatment as necessary, especially if asymptomatic • Low expectations about treatment • Financial barriers • Physical barriers 	<ul style="list-style-type: none"> • Using pill boxes or reminder packaging • Encouraging patients to relate pill taking to daily activities • Reducing the number of medications. Use combination products or omit medications with a low benefit/risk ratio. • Reminding patients that they have a lifelong condition that requires their involvement • Using health coaching techniques such as reflective listening to encourage behavior change • Tailoring medication regimens to patients' health care goals and life expectancy • Using monitoring (blood glucose, blood pressure, cholesterol) to motivate and educate • Helping patients find free or low-cost medications • Helping patients find devices to overcome their physical limitations
Medication-related issues	
<ul style="list-style-type: none"> • Complex medication regimens • Concerns about side effects 	<ul style="list-style-type: none"> • Reviewing medications at each visit and eliminating medications that are not needed • Simplifying dosing regimens. Adherence is best with once-daily dosing. • Reducing the number of medications. Use combination products or omit medications with a low benefit/risk ratio. • Discussing side effects in the context of medication benefits • Using "positive framing" when discussing the potential for side effects (e.g., "If 1 in 100 patients experiences a side effect, then this means that 99 in 100 patients do not.")
Prescriber-related issues	
<ul style="list-style-type: none"> • Limited time to provide information at office visits • Failure to provide information in a way patients can understand • Authoritarian approach instead of patient empowerment approach 	<ul style="list-style-type: none"> • Practicing effective communication • Assessing what patients need to know. Providing information on the drug's mechanism of action may not always be needed for adherence. • Providing clear, written instructions • Assessing understanding of instructions • Asking about medication adherence at every visit. Make it important. • Encouraging patients to make a list of medications and to keep the list current • Having indications on the prescription and label, if possible • Helping patients find free or low-cost medications (e.g., popular websites include www.needymeds.org and www.rxassist.org)

as powerful a tool as the medications we prescribe."

What we say to patients and how we say it can really make a difference.

Pharmacy-related factors

Many pharmacists are in an ideal position to promote medication adherence because of their frequent contact with patients. One study in particular, the Federal Study of Adherence to Medications in the Elderly,²² demonstrated the effectiveness of pharmacists

in increasing medication adherence. This study followed 200 patients ≥ 65 years of age who were taking at least four medications. Medication adherence, blood pressure, and cholesterol were improved in patients who participated in a comprehensive pharmacy care program. Despite this potential for success, many pharmacists face barriers such as space limitations, lack of time and resources, and lack of management support to counsel patients on medication adherence.

Improving Medication Adherence in Patients

Although medication adherence has been well studied, there are few data on what specific interventions work to improve medication adherence.¹² Table 5 lists various strategies that can be used to help overcome some of the barriers to medication adherence. For many health care providers, the first step in addressing this problem may be to change how they think about and discuss medications with patients. An

Table 6. Online Resources for Improving Patient Knowledge About Medication Use

- ASK (Adherence Starts with Knowledge): www.takingmeds.com
- MUST for Seniors: www.mustforseniors.org
- “Be An Active Member of Your Health Care Team”: www.fda.gov/cder/consumerinfo/active12panelEng.htm
- “Check Your Medicines: Tips for Using Medicines Safely”: <http://www.ahrq.gov/consumer/checkmeds.htm>
- “Your Medicine: Play It Safe”: <http://www.ahrq.gov/CONSUMER/safe-meds/safemeds.pdf>

open-ended question such as, “How many doses of your medication have you missed over the past week?” instead of “Have you missed any doses of your medication” (a closed-ended question) may provide patients an opportunity to voice a concern. Using more open-ended questions and a non-judgmental tone of voice can improve communication and allow for more information to be exchanged.

Table 6 lists resources that can be used to help educate patients about the value of their role as part of their health care team. GlaxoSmithKline recently published a 20-question survey titled “Taking Medicine—What Gets in the Way?” that can be given to patients to help uncover barriers to medication adherence. This survey can be accessed online at www.takingmeds.com. Because health literacy has been identified as an issue for many people, it may be helpful to review an online summary of best practices in health communication at <http://www.health.gov/communication/literacy/quickguide/healthinfo.htm>.

Ultimately, patients decide when and how they take their medications. Health care providers can reduce or help remove some of the barriers to adherence through appropriate education, medication, cost reduction when possible, and open conversations that allow patients to express their concerns.

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