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Adherence to pharmacologic therapy in patients with type 2 diabetes mellitus

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Many patients who have type 2 diabetes mellitus (DM) require several different medications. Although these agents can substantially reduce diabetes-related morbidity and mortality, the extent of treatment benefits may be limited by a lack of treatment adherence. Unfortunately, little information is available on treatment adherence in patients with type 2 DM. Available data indicate substantial opportunity for improving clinical outcomes through improved treatment adherence. Factors that appear to influence adherence include the patient's comprehension of the treatment regimen and its benefits, adverse effects, medication costs, and regimen complexity, as well as the patient's emotional well-being. Outcomes research emphasizes the importance of effective patient–provider communication in overcoming some of the barriers to adherence. This article offers specific suggestions for improving adherence in patients with type 2 DM seen in general clinical practice.

Many patients who have type 2 diabetes mellitus (DM) require several different medications. In a US survey of adults treated with glucose-lowering medication, 50% reported using ≥7 medications in their prescribed treatment regimen, including ≥2 glucose-lowering agents.[1] The reason for the large numbers of prescriptions is clear: evidence shows that tight control of blood glucose, cholesterol, and blood pressure helps these patients stay healthy. In fact, the potential for better outcomes has never been greater for those who adhere to their regimens.

The number of pharmacologic agents prescribed and the number of patients who need them are growing at a disturbingly fast pace due to the type 2 DM epidemic. Improved treatment adherence may close the gap between potential treatment benefits and the benefits patients actually receive.[1-4] However, despite the importance of adherence for patients with type 2 DM, surprisingly little is known about the problems related to medication adherence in this disease state.[5]

This article discusses what is known about estimated adherence rates, factors affecting adherence, and interventions to facilitate adherence in the type 2 DM patient population.

Adherence rates

In 1995, Mason and colleagues[6] and Matsuyama and coworkers[7] studied 47 patients with type 2 DM. They assessed treatment adherence using medication containers with electronic monitoring systems that counted the number of times a patient opened them. Assessment of medication adherence by provider, patient self-report, and pill counts was less reliable for explaining metabolic control than was the electronic monitoring system.

Since that time, ~20 studies of treatment adherence in patients with type 2 DM have been reported, with most published in the past few years (**Table 1**).[8-25] These studies are inclusive of several that used protocols requiring electronic monitoring[8-10] and retrospective studies that used

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Table 1 Treatment adherence in patients with type 2 diabetes mellitus

Type of medication	No. of Studies	Adherence Rate (%)
Oral blood glucose–lowering	25	65–85*
Insulin	2	60–80
Blood pressure, cholesterol-lowering	3	75–90

*The adherence rate was lower (36%–54%) for certain agents, regimens, and populations.

Table 2 Factors influencing treatment adherence

Factor	Critical Issues
Comprehension of regimen	• Health literacy • Clinician's use of jargon • Closing the communication loop
Perception of benefits	• Medications provide limited symptom relief • Personally meaningful long-term benefit critical • Role of clinician's attitudes toward medication
Side effects	• Vary by agent • Rarely discussed
Medication costs	• Rarely discussed
Regimen complexity	• Adherence to timing may be greatly affected
Emotional well-being	• Benefits of treating depression, diabetes distress

large prescription databases maintained by pharmacy benefits managers, health maintenance organizations, Medicaid, or national health services.[11-14] Most of these studies reported that adherence to oral blood glucose–lowering therapy ranged from 65% to 85%,[2,6-12,14-19] although a few reported lower rates (36%–54%) for certain patient populations (eg, Medicaid recipients)[13] and regimens (those requiring more frequent dosing).[16,20,21]

Due to the small number of studies, differences in study designs, and variations in the findings, little is known specifically about adherence to oral blood glucose–lowering medications in patients with type 2 DM. Even less is known about adherence to insulin, blood pressure–lowering, and lipid-lowering therapies in these patients. The few studies that are available suggest that self-reported adherence to blood pressure–lowering and lipid-lowering medication regimens may be a bit higher than adherence to oral glucose–lowering regimens,[22-24] whereas adherence to insulin regimens may be slightly lower.[17,25] Whether adherence rates are high or low, there is substantial room for improvement.

Factors influencing adherence

Comprehension of the treatment regimen

Of the factors that may affect treatment adherence (**Table 2**), perhaps the most common and most overlooked is patients' comprehension of the treatment regimen, which clinicians often overestimate. Schillinger and coworkers[26] studied 408 English-speaking and Spanish-speaking patients in public hospitals and found that >50% of both groups had limited health literacy, defined as comprehension of common medical terms or concepts (eg, *stable blood pressure*) and/or instructions, such as for dosing (eg, *take this medication 4 times a day*). Lack of patient comprehension often goes unrecognized by physicians, who rarely verify patients' recall and comprehension of their treatment regimens.

In another study by Schillinger's group,[27] office visits of patients with type 2 DM were audiotaped to determine how often physicians introduced a new concept (e.g., a treatment-adjustment recommendation) and how often they assessed patients' recall and comprehension of that concept. In 82% of office visits, ≥1 new concept was introduced, at least half of which concerned a treatment adjustment. Physicians assessed patient recall and comprehension in only 12% of these situations. The mean duration of visits in which recall and comprehension were assessed was similar to that of visits in which they were not. Furthermore, patients whose physicians assessed recall and comprehension had lower glycosylated hemoglobin (Hb) A_{1c} concentrations than those patients whose physicians did not assess recall. This study demonstrates the need for and impact of effective physician–patient communication regarding treatment regimens.