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Self-management of type 2 diabetes: A good idea—or not?

The evidence supports the use of some measures but is questionable on others, including routine self-monitoring of blood glucose.

PRACTICE RECOMMENDATIONS

› *Recommend self-monitoring of blood glucose to anyone using insulin.* (B)

› *Consider self-monitoring of blood glucose in non-insulin-treated diabetes, but recognize that its effect on glycemic control is limited.* (B)

› *Consider self-management programs to promote patient involvement, but keep in mind that there is insufficient evidence to recommend for or against them.* (B)

Strength of recommendation (SOR)

(A) Good-quality patient-oriented evidence

(B) Inconsistent or limited-quality patient-oriented evidence

(C) Consensus, usual practice, opinion, disease-oriented evidence, case series

CASE ▶ Donna M is a 53-year-old woman with type 2 diabetes mellitus, who maintains fair glycemic control with metformin and glipizide. Her HbA1c level is 8.7%, but she has mixed feelings about initiating insulin treatment. Many of her family members also struggle with diabetes, and they frequently accompany Ms. M on her office visits. Ms. M is motivated to do whatever she can—in addition to taking her medications—to improve her diabetes. Her family asks if there is anything they can do to help. If you were Ms. M's physician, what would you recommend?

The Centers for Disease Control and Prevention (CDC) estimates that diabetes affects 25.8 million people (or 8.3% of the population) in the United States, and that 7 million of them are undiagnosed.[1] Based on the known prevalence of prediabetes, the CDC estimates that 79 million Americans ≥20 years of age are at risk for diabetes. Approximately 5.7 million people with diabetes take insulin, with or without oral medications.[2]

As the spotlight shines brighter on efforts to promote patient-centeredness in health care—especially with respect to chronic illness—attention to the role of self-management has also grown. And family physicians have begun to reconsider how best to engage and motivate patients to manage their illness.

In this article, we review "what else" patients can do—and perhaps need not do—based on the evidence.

What is self-management anyway?

The concept of self-management is not foreign to most family physicians, yet they and their patients probably do not share a common understanding of what it entails. The American Diabetes Association (ADA) defines diabetes self-management as "the ongoing process of facilitating the knowledge, skill,

and ability necessary for diabetes self-care. Self-management should incorporate the needs, goals, and life experiences of the person with diabetes and should be guided by evidence-based standards. The overall objectives of DSME (diabetes self-management education) are to support informed decision-making, self-care behaviors, problem solving, and active collaboration with the health care team and improve clinical outcomes, health status, and quality of life."[3]

Few family physicians would disagree that self-management is a good thing for patients, but many would be surprised to find that the evidence for self-management is not as convincing as one might expect. The CDC reports that 57.4% of patients with diabetes have attended a self-management class for diabetes, and 63.6% perform daily self-monitoring of blood glucose (SMBG).[4] Yet, there is only indirect evidence that self-management programs are associated with modest improvements in HbA1c.[5] SMBG has long been considered a mainstay of diabetes self-care, yet a growing body of evidence has shown that this practice is not universally beneficial.[6] Although self-management education may reduce HbA1c levels in the short term, the long-term clinical effectiveness of SMBG has not been established.[7-11]

Know when to recommend SMBG

With clinical interventions, we want to give priority to those that significantly improve patient outcomes. Checking blood glucose makes good sense for insulin-treated patients to monitor for and prevent asymptomatic hypoglycemia or hyperglycemia, especially when the risk for these complications is high. In a large database study of almost 27,000 children and adolescents with type 1 diabetes, increased daily frequency of SMBG, after adjustment for multiple confounders, was significantly associated with lower HbA1c levels (–0.2% per additional test per day, leveling off at 5 tests per day) and fewer acute complications.[12]

Although it has been suggested that more frequent SMBG improves long-term glycemic control among patients with insulin-treated type 1 and type 2 diabetes, the benefits are modest.[13] The ADA recommends SMBG 3 or more times daily for patients using multiple insulin injections or insulin pump therapy.[14]

In patients with type 2 diabetes who are not taking insulin, the benefits of SMBG are less clear. A meta-analysis of SMBG in non-insulin-treated patients with type 2 diabetes showed that it was associated with a reduction of HbA1c of –0.4%.[15] A Cochrane review added that SMBG leads to small but significant decreases after 6 months, but that these improvements are not sustained at 12 months. The same review noted no improvements in patient satisfaction or general health-related quality of life resulting from SMBG.[6] But many of the studies in this analysis included other interventions, making it difficult to isolate the impact of SMBG on glycemic control. Other studies show that SMBG does not improve glycemic control at all.[16]

For patients using less-frequent insulin injections, non-insulin therapies, or medical nutrition therapy alone, the ADA suggests that SMBG may be useful as a guide to management. Continuous glucose monitoring for patients with type 2 diabetes might improve glycemic control, but the evidence for this is inconsistent.[17]

Why *wouldn't* you want to recommend self-monitoring? Despite the fact that the benefits of SMBG are unclear in patients with type 2 diabetes not treated with insulin, it's hard to imagine why this practice could be harmful to patients. After all, it's natural to assume that more knowledge must be a good thing. Unfortunately, it is not that simple. Even in newly diagnosed patients with type 2 diabetes not taking insulin, self-monitoring does not improve glycemic control and may increase depression.[16]

It is also important to remember that self-monitoring comes at considerable cost, monetarily for the health care system and in impaired quality of life for patients.[18] While there is scant evidence in the empiric literature about patient attitudes toward self-monitoring, the available evidence suggests that patients are ambivalent about it. One qualitative study concluded that patients tended not to act on the results of self-monitoring, in part because of a lack of education about the ap-

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propriate response to readings.[19] With better knowledge, it is possible that patients might find more value in SMBG.

Self-management programs: Not all are created equal

The driving principle in patient-centered care is engaging patients to be active participants in the management of their chronic conditions. At face value, this would seem to be a good thing. But although individual trials of self-management are promising, the balance of evidence for self-management is limited and inconclusive. In a systematic review of 72 randomized trials of DSME in patients ≥18 years with type 2 diabetes, short-term improvements in diabetes knowledge, frequency and accuracy of glucose self-monitoring, self-reported dietary habits, and better glycemic control were possible, but long-term clinical effectiveness was not shown. In this analysis, there was no significant effect on cardiovascular events or mortality.[20] In another systematic review and critique of the literature on self-management, investigators again found small to moderate effects, but with significant evidence of publication bias in the included trials.[21]

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The uncertainty about self-management exists because not all self-management interventions have equal impact on patient outcomes. Motivational interviewing, collaborative problem solving, and negotiating individualized goals for each patient, for example, may have longer-standing benefit than those focused on education alone.[22]

A 2009 meta-analysis of DSME and its efficacy differentiated teaching, behavioral, psychological, and "mixed" or combination approaches. Most of the interventions were behaviorally oriented, sometimes combined with one other format. Psychological interventions targeting negative or self-defeating moods and social and emotional coping skills yielded moderate effects on metabolic control and self-care behaviors.[23]

Clinic-based self-management. One randomized prospective study compared intensive clinic-based education on complications of diabetes with standard care. After 4 years, patients exhibited significant reductions in HbA1c, blood pressure, and low-density lipoprotein cholesterol levels.[24]

A large meta-analysis examining a range of self-management programs for multiple chronic conditions showed a statistically and clinically significant improvement in glycemic control equivalent to a 0.81% reduction in HbA1c. Features of self-management addressed in this meta-analysis included various forms of nurse- and provider-driven education about medications, diet and exercise, motivational interviewing, and biofeedback.[25]

Nurse-led DSME has been associated with improvements in HbA1c and cardiovascular risk factors.[26] Dietician-led DSME has been associated improvements in HbA1c when compared with routine care.[26]

Cognitive behavioral therapy. Overall, the most frequently reported and most widely used psychosocial intervention is cognitive behavioral therapy (CBT); it is often short term and skills based, targeting unhelpful negative thinking and increasing positive behavior, including problem solving and relaxation, which have been shown to be effective in treating depression.[27] An older randomized control trial (RCT) specifically focused on type 2 diabetes explored the impact of CBT on both diabetes and depression among patients with diabetes and comorbid major depressive disorder (MDD). Improvements in depression seen at the end of the intervention were still evident 6 months later. And while there was no difference in HbA1c levels immediately following the intervention, after 6 months the mean HbA1c level was significantly better in the CBT group than in the control group (9.5% vs 10.9%; P=.03). There was no statistically significant difference in SMBG between the groups.[28]

Group-based vs individual training. The evidence comparing group-based and individual self-management support is inconsistent. In one RCT focused on personalized action-oriented goals for healthy eating, SMBG, taking medications, problem solving, risk reduction, healthy coping, and physical activity, individual education led to reductions in HbA1c levels (–0.51%) after 6 months that were not observed in the group-based education and usual care groups.[10] On the

other hand, a Cochrane review of trials comparing group-based and individual routine care suggested greater benefits overall in group-based approaches, but with the caveat that many of the included trials had methodological limitations.[29]

Mobile phone and online interventions? Stay tuned

The jury is still out on interventions like peer advising and telephone, telemedicine, and online support. In a systematic review of 22 trials evaluating mobile phone interventions for self-management (eg, text messaging, phone reminders, and coaching interventions), investigators observed a 0.5% decrease in HbA1c levels over a median follow-up period of 6 months.[30] Various telephone interventions have shown modest and short-term improvements in HbA1c levels, but none of these interventions has improved clinical outcomes.[31-33] Combinations of telephone and online self-management are beginning to show promise, but so far the evidence shows only short-term benefit, and clinical outcomes have not been studied.[34,35]

CASE ▶ Based on the available evidence, a number of ways to support Ms. M's efforts at self-management would be justified. Eliciting her perspective on the options would be well worth the effort. She is not taking insulin, so we would not recommend daily SMBG, but we'd support her if she expressed a strong preference for self-monitoring. Once insulin treatment enters the picture, however, we would strongly recommend daily SMBG to promote patient engagement and safety. And although there is limited evidence to support referral to self-management programs, if a particular program fit Ms. M's lifestyle, we would refer her nonetheless. JFP

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Motivational interviewing, collaborative problem solving, and negotiating individualized goals may be more beneficial long term than focusing on education alone.

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