# Self-Monitoring of Blood Glucose: Depressingly Not Helpful in the Newly Diagnosed

*O'Kane MJ, Bunting B, Copeland M, Coates VE; ESMON study group. Efficacy of self monitoring of blood glucose in patients with newly diagnosed type 2 diabetes (ESMON study): randomised controlled trial. BMJ 2008;336:1174–7.*

## Study Overview

Objective. To evaluate the effectiveness of blood glucose self-monitoring on glycemic control and psychological outcomes in patients with newly diagnosed type 2 diabetes mellitus.

Design. Randomized controlled trial.

Setting and participants. Four outpatient diabetes referral clinics in Northern Ireland enrolled 184 adults with newly diagnosed type 2 diabetes (60% men; mean hemoglobin $A_{1c}$ [$HbA_{1c}$], 8.7%). Patients were excluded if they were on insulin, had previously self-monitored blood glucose levels, had chronic liver or kidney disease or secondary diabetes, misused alcohol, or had a major illness in the previous 6 months. Patients in the self-monitoring group received a glucose monitor and education regarding its use. Both groups received diabetes education.

Main outcome measures. Changes in mean group $HbA_{1c}$ levels, body mass index (BMI), self-reported hypoglycemic episodes, use of hypoglycemic drugs, and psychological scores at 12 months. Psychological outcomes were evaluated using a validated diabetes satisfaction questionnaire, a modified diabetes attitude scale, and a well-being questionnaire with subscales.

Main results. At 12 months, mean group $HbA_{1c}$ levels were similar in both the self-monitoring and control groups (6.9% in each group [95% confidence interval for difference, –0.25% to 0.38%]; $P = 0.69$). The use of hypoglycemic drugs, reported incidence of hypoglycemia, and BMI were not significantly different between the 2 groups. The self-monitoring group had a statistically significant 6% higher score on the depression subscale of the well-being questionnaire ($P = 0.011$). Although there was a trend for increased anxiety in the self-monitoring group, no significant differences (at the $P < 0.05$ level) were reported in any other subscale of the well-being score, in the diabetes attitude questionnaire scale, or diabetes treatment satisfaction scale.

Conclusion. Blood glucose self-monitoring in patients with newly diagnosed type 2 diabetes does not improve glycemic control and is associated with slightly higher depression scores on a validated well-being questionnaire.

## Commentary

Self-monitoring of blood glucose is widely accepted as an integral part of diabetes care, even in diabetic patients not taking insulin. Advocates for self-monitoring in diabetic patients using oral agents suggest that it may improve glycemic control through better medication adherence or that the immediate feedback provided by monitoring might increase patient satisfaction with their medication regimens. Until recently, evidence from high-quality trials has been contradictory due to a wide range of trial designs and varying patient populations. A large cohort study of 3268 patients found that self-monitoring of blood glucose was associated with a reduction in microvascular and macrovascular events over 6.5 years [1]. However, because the study was retrospective and nonrandomized, it is difficult to exclude the possibility that more highly motivated patients who use more health services were more likely to self-monitor. Two recent randomized controlled trials (DiGEM and ASIA) provided contradictory findings regarding self-monitoring. The DiGEM trial involving 453 diabetic patients found that self-monitoring did not significantly lower $HbA_{1c}$ levels compared with controls [2]. However, the ASIA trial involving 689 patients found that self-monitoring resulted in a statistically significant 0.3% greater reduction of $HbA_{1c}$ levels in the self-monitoring group as compared with the control group [3]. Both of these trials included patients with well-established diabetes but they had relatively high dropout rates (> 40% in the ASIA trial).

This study by O'Kane et al (ESMON) aimed to assess the efficacy of self-monitoring in newly diagnosed patients with diabetes referred to diabetes clinics. This study was well-conducted, randomized a high proportion (87%) of eligible participants, and had only a 2% dropout rate. Uniform drug treatment algorithms and structured educational programs were used across both groups. By utilizing standardized algo-

rithms and a randomized design focusing on self-monitoring in newly diagnosed patients with no previous monitoring experience, the authors were able to isolate the effects of self-monitoring in a way that previous trials could not.

There were several limitations to the ESMON trial. A relatively small number of patients (184) referred to specialty diabetes clinics were included, and the results may not be generalizable to primary care practices with a larger and more heterogeneous population of diabetic patients. It is possible that patients in this study also had more advanced or poorly controlled diabetes on presentation, as evidenced by the referral to a specialty clinic and the high $HbA_{1c}$ levels at baseline (8.6% and 8.8% in the control and self-monitoring groups, respectively). Finally, the intriguing finding in the self-monitoring group of increased depression was not large in magnitude (absolute difference, 6%) and no other well-being or attitude scale differences corroborated this subscale finding. Certainly, though, many patients report that self-monitoring is somewhat painful and unpalatable and therefore this finding does make at least theoretical sense.

## Applications for Clinical Practice

Self-monitoring of blood glucose in newly diagnosed patients with diabetes on oral agents alone does not improve $HbA_{1c}$ levels, reduce BMI, or decrease hypoglycemic events. Self-monitoring may increase feelings of depression related to the discomfort associated with the use of a glucometer. Clinicians should consider recommending self-monitoring only for patients on insulin or those who are highly motivated to track their glucose levels.

*—Review by Asaf Bitton, MD*

## References

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