Q/Do patients with type 2 diabetes who aren't taking insulin benefit from self-monitoring blood glucose?

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EVIDENCE-BASED ANSWER

A/ **YES, UNDER SOME CIRCUMSTANCES.** Patients with type 2 diabetes who aren't on insulin and perform self-monitoring of blood glucose (SMBG) show small but significant reductions in hemoglobin A1c (HbA1c) at 6 months but not at 12 months (strength of recommendation [SOR]: **B**, systematic reviews and meta-analyses of disease-oriented evidence).

Patients with a baseline HbA1c <8% who self-monitor don't reduce their HbA1c levels, but patients with a baseline HbA1c >8% do (SOR: **B**, systematic reviews and meta-analyses of disease-oriented evidence).

More frequent SMBG—4 to 7 times weekly—doesn't reduce HbA1c more than less frequent self-monitoring—1 or 2 times a week (SOR: **B**, a systematic review and meta-analysis of disease-oriented evidence).

Evidence summary

A 2012 Cochrane review and meta-analysis of 9 RCTs found that 1261 patients who used SMBG showed a small but statistically significant decrease in HbA1c at 6 months compared with 1063 controls. In 2 other RCTs, patients using SMBG showed a nonsignificant decrease in HbA1c compared with control subjects at 12 months (**TABLE 1**).[1]

Another meta-analysis reported similar findings. The study grouped 9 RCTs based on the duration of SMBG and examined the change in HbA1c from baseline. In 5 of the trials, SMBG for 6 months was associated with a small decrease in HbA1c, but in the other 4, SMBG for longer than one year didn't significantly change HbA1c levels.[2]

Baseline values make a difference

A meta-analysis of 9 RCTs demonstrated that SMBG was marginally superior to non-SMBG for reducing HbA1c when the baseline value was >8%. SMBG didn't lower HbA1c in patients with a baseline HbA1c <8%. The greatest change in HbA1c occurred in patients with baseline values >10% (**TABLE 2**).[3]

In another meta-analysis, 12 of 15 RCTs found SMBG to be better than non-SMBG at reducing HbA1c when the baseline was >8%.[4]

Limitations of studies

Limitations of the studies (**TABLES 1 AND 2**) reviewed included methodological quality,[1,3] limited patient compliance reporting,[3] heterogeneity,[1,2,4] and small sample size.[2,3]

More frequent self-monitoring has no effect

A systematic review of 4 RCTs with a total of 637 patients compared frequent SMBG (4-7 times a week) with less frequent self-monitoring (1-2 times a week) for periods ranging from 3 to 12 months and found no difference in reduction of values (HbA1c reduction difference between the groups = −0.21; 95% confidence interval, −0.57 to 0.15).[4]

CONTINUED ON PAGE 48

CONTINUED FROM PAGE 39

TABLE 1

Difference in HbA1c by duration of self-monitoring*

Study	Duration (months)	Total number of patients	Number of patients using SMBG	Number of patients not using SMBG	Mean HbA1c difference	95% CI for average HbA1c reduction
Meta-analysis[1]	6	2324	1261	1063	–0.26	–0.39 to –0.13 Test overall effect Z=3.99 (*P*<.0001)
Meta-analysis[2]	6	1563	858	705	–0.21	–0.38 to –0.04 (*P* value NR)
Meta-analysis[1]	12	493	323	170	–0.13	–0.31 to 0.04 Test overall effect Z=1.50 (*P*=.13)
Meta-analysis[2]	12	648	391	257	–0.16	–0.38 to 0.05 (NS)

CI, confidence interval; HbA1c, hemoglobin A1c; NR, not reported; NS, not significant; SMBG, self-monitoring blood glucose.

*Mean HbA1c was not reported for either of the 2 studies described here.

TABLE 2

Patients benefit from self-monitoring when baseline HbA1c is >8%

Study	Duration (months)	Number of patients	Baseline HbA1c	Mean HbA1c difference	95% CI for average HbA1c reduction
Meta-analysis[3]	6-12	SMBG=301 Controls=150	<8%	–0.15	–0.33 to 0.03 (NS)
Meta-analysis[4]	6-12	SMBG=386 Controls=390	<8%	–0.21	–0.37 to –0.05 (NS)
Meta-analysis[3]	6-12	SMBG=964 Controls=920	8%-10%	–0.27	–0.40 to –0.14 (*P*<.0001)
Meta-analysis[4]	4-12	SMBG=1154 Controls=1156	≥8%	–0.38	–0.58 to –0.18 (*P* value NR)
Meta-analysis[3]	4-7	SMBG=29 Controls=33	>10%	–1.23	–2.31 to –0.14 (*P*<.03)

CI, confidence interval; HbA1c, hemoglobin A1c; NR, not reported; NS, not significant; SMBG, self-monitoring blood glucose.

Recommendations

The American Diabetes Association advocates SMBG as a guide for patients who use oral or medical nutrition therapies for diabetes. Patients should receive initial instruction in SMBG and routine follow-up evaluation of their technique and ability to use data to adjust therapy.[5]

The American Association of Clinical Endocrinologists (AACE) advises that SMBG can be initiated at the same time as medical therapy, lifestyle modification, specific diabetes education, or dietary consultation. If HbA1c levels are above target, the AACE recommends more frequent SMBG: preprandially, 2 hours postprandially, occasionally between 2 am and 3 am, during illness, or anytime a low glucose level is suspected.[6] JFP

References

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