Use of Structured Self-Monitoring of Blood Glucose Improves Glycemic Control in Real-World Clinical Practice: Findings from a Multinational and Retrospectively Controlled Trial

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Structured self-monitoring of blood glucose (SMBG) is an approach to diabetes management in which blood glucose data are generated according to a defined testing regimen, interpreted, and then used to make changes in therapy.[1] Findings from recent studies have demonstrated that appropriate use of structured SMBG improves glycemic control, facilitates therapy intensification, and promotes desired behavioral changes, leading to improved clinical outcomes.[2–9]

We have reported findings from a 3-month, noncontrolled, interventional study that used a modified version of the Structured Testing Program study intervention, demonstrating that this approach can be effectively adapted for use in general medical practice to improve hemoglobin A1c (HbA1c) levels.[10] At study end, participants showed significant reductions in mean [standard deviation (SD)] HbA1c levels compared to baseline from 9.2% (1.6%) to 8.0% (1.4%), $p < .001$). Improvements in average blood glucose, body mass index, lipids, and blood pressure were also highly significant ($p < .001$). To further determine the efficacy of the intervention, we analyzed 6-month follow-up data from participants enrolled in our prior study and assessed changes in their glycemic control compared with that of participants who did not use structured SMBG.

In our 6-month retrospectively controlled study, 526 diabetes patients (99 type 1, 423 type 2) were asked to generate a blood glucose profile before their 3-month and 6-month clinic visits, using a paper-based tool (ACCU-CHEK® 360° View Blood Glucose Analysis System, Roche Diagnostics, Mannheim, Germany). Measurements were taken before and 2 h after main meals and before bedtime on three consecutive days. End points included change from baseline in HbA1c and other parameters of diabetes complications. Data were also obtained from an additional 122 patients (control subjects) who did not use structured SMBG during the same time period. Baseline HbA1c values for the active and control groups were 9.5 (1.6%) and 9.1 (1.1%), respectively.

At 6 months, paired HbA1c values were obtained for 281 active and 122 control group participants. Active group participants showed significantly greater reductions in mean (SD) HbA1c levels at 6 months compared with control group patients: -1.9% (2.0) vs -0.3% (0.1); $p < .0001$. The percentage of participants who reported at least one severe hypoglycemic event was significantly greater in the control group than in the active group: 34.4% ($n = 42$) vs 3.9% ($n = 21$).

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Abbreviation: (HbA1c) hemoglobin A1c, (SD) standard deviation, (SMBG) self-monitoring of blood glucose

Keywords: HbA1c, self-monitoring, SMBG, type 2 diabetes

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Our findings suggest that use of structured SMBG results in greater HbA1c improvement with markedly less hypoglycemia than use of nonstructured SMBG in poorly controlled type 1 diabetes mellitus and type 2 diabetes mellitus patients and that structured SMBG is practical in real-world clinical settings. Moreover, our results are consistent with findings from several trials in which structured SMBG was used as a component of treatment.[2–9]

Given the increasing prevalence of diabetes worldwide, it is important that treatment tools and approaches are used effectively to facilitate improved clinical outcomes and to reduce the costs associated with poorly managed diabetes. Contrary to random or unfocused glucose monitoring, structured SMBG has been shown to be a valuable, practical component of effective diabetes management in real-world clinical settings. Additional studies are needed to elucidate how structured SMBG can be used most effectively in various patient populations and practice settings.

Funding:

This study was funded by Roche Diagnostics Deutschland GmbH, Mannheim, Germany.

Disclosures:

Mallem Nourredine has consulted for Roche Diagnostics, Eli Lilly and Company and Novo Nordisk. Christopher Parkin has consulted for Roche Diagnostics and DexCom. Ulrich Schweppe and Ildiko Amann-Zalan are employees of Roche Diagnostics Deutschland GmbH, Mannheim, Germany.

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