

Self-monitoring of blood glucose

In this new section, a panel of multidisciplinary team members give their opinions on a recently published diabetes paper. In this issue, the focus is on self-monitoring of blood glucose in people with type 2 diabetes who are not using insulin.



Brian Frier,
Consultant
Physician and
Honorary Professor,
The Royal Infirmary,
Edinburgh

Controversy continues over the value of self-monitoring blood glucose (SMBG) in type 2 diabetes. This large prospective survey showed no benefit to glycaemic control from using SMBG, and will be embraced by

detractors of regular testing.

However, this was not a randomised, controlled trial, but was an observational study of a heterogeneous population over a period of 3 years, during which metabolic control would be anticipated to deteriorate with progression of disease severity. Only empowerment of patients to intensify their treatment on the basis of SMBG results would

counteract the progression of type 2 diabetes; a decline in HbA_{1c} was indeed observed in individuals who had changed their treatment.

The value of SMBG in detecting and avoiding hypoglycaemia was apparent, but this problem exists only with sulphonylureas. It is very difficult to isolate any potential benefit of SMBG in managing this complex disorder, in which so many variables exert an effect, including erratic adherence to treatment.

What this study does show is that most patients test their blood glucose too infrequently to be of clinical value. Simply

measuring blood glucose but taking no action has no clinical benefit. This study does not undermine the case for selective use of SMBG in type 2 diabetes, but illustrates the need for appropriate application strategies.

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'It is stated that HbA_{1c} did not improve over the 3-year study but neither did it appear to decline – yet type 2 diabetes is a progressive condition'



Gwen Hall
Practice Nurse/
Trainer, Haslemere

Support people with diabetes in blood glucose monitoring as part of structured education, involving them in the process and in taking action on the results.

This paper recognises the importance of this approach.

The Audit Commission's report *Testing Times* (Audit Commission, 2000) quoted a patient as saying: 'I have no idea whatsoever why I do daily blood-checks ... I have not the remotest idea what I am keeping the record for.' I wonder if this was the case in the period between consultations for the participants in Franciosi et al's study.

A flexible approach to education, tailored to the individual, should be the norm. The National

Service Framework for diabetes advocates local contacts for advice for people with diabetes. Did the people in this study have that flexibility?

It is stated that HbA_{1c} did not improve over the 3 years but neither did it appear to decline – yet type 2 diabetes is progressive. Was medication titrated up and, if so, on what basis? Purely at 6-monthly visits based on HbA_{1c}? How else can patients confirm 'hypos' or follow 'sick day rules'?

The authors are right: more research is needed, and I would like to see patient autonomy, empowerment, call it what you will, included in the parameters of that research.

Audit Commission (2000) *Testing Times: A Review of Diabetes Services in England and Wales*. Audit Commission, London. Available at <http://www.audit-commission.gov.uk/Products/NATIONAL-REPORT/EB2CA6BA-C5E5-4B8F-A984-898D19E8C603/nrdiabet.pdf> (accessed 30.08.05)

Self-monitoring of blood glucose in non-insulin-treated diabetic patients: a longitudinal evaluation of its impact on metabolic control

Franciosi M, Pellegrini F, De Berardis G et al (2005) *Diabetic Medicine* 22: 900–6

DIABETIC MEDICINE



Frequency of SMBG does not predict metabolic control

- 1 The importance of normoglycaemia in preventing the onset of diabetic complications is well established.
- 2 Self-monitoring of blood glucose (SMBG) is a technique that has been recommended for improving blood glucose control in people with diabetes, although its role in people with non-insulin-treated type 2 diabetes is debated.
- 3 In this paper, as part of a nationwide outcomes research programme in Italy, the investigators examined the effect of SMBG on metabolic control over 3 years in people with type 2 diabetes not treated with insulin.
- 4 The study involved 1896 patients. Participants completed a questionnaire on their SMBG activity at 6-monthly intervals. The questionnaire also included questions on hypoglycaemia, diabetes complications and SMBG support from the patients' families. Additional →

→ clinical data were collected at the same time points from clinicians. Overall, 101 outpatient diabetes clinics and 103 GPs participated in the trial.

5 SMBG frequency was assessed in one question using a six-point scale (ranging from '>1 time/day' to 'never'). The validity of the answer to this question was assessed with a second question in a different part of the questionnaire which asked how many times the participant had measured his/her blood glucose in the last 2 weeks. Answers to these two questions correlated well, suggesting the SMBG data collected in this way were reliable.

6 Multi-level statistical analysis was used to assess the predictive value of SMBG frequency on long-term metabolic control. A tree-based algorithm (recursive partitioning and amalgamation [RECPAM]) was used to identify distinct subgroups of patients with the same likelihood of performing SMBG. The impact of SMBG was then assessed within these groups.

7 Overall, 78 % of the participants were treated with oral agents, and 22 % managed their diabetes by diet alone. Forty-one per cent of participants carried out SMBG at least once per week. The frequency of SMBG did not have a statistically significant impact on HbA_{1c} levels over the 3-year study. Furthermore, the investigators did not observe that changes in SMBG frequency resulted in significant impacts on HbA_{1c} level.

8 In none of the eight RECPAM-identified subgroups was increased SMBG frequency found to improve HbA_{1c} level over the 3-year follow-up. However, SMBG was associated with decreased hypoglycaemia in those RECPAM groups where SMBG was performed to avoid hypoglycaemia.

9 The authors concluded that SMBG frequency did not predict improved metabolic control in people with non-insulin-treated type 2 diabetes over a 3-year period. Similarly, they were unable to identify any patient subgroups where SMBG was associated with lower HbA_{1c} values.



Lorraine Avery
Nurse Consultant in
Diabetes,
Chichester

The value of SMBG has caused much debate. There has been more focus on its relevance in type 2 diabetes. This debate would appear to be cost-driven rather than based on clinical need, owing to the apparent lack of evidence to support an improvement in metabolic outcomes as a result of SMBG.

In this paper, Franciosi and co-authors have undertaken, as far as I'm aware, the first prospective observational study on a large number of people with type 2 diabetes. They

conclude that performing SMBG, regardless of frequency, was not associated with an improvement in HbA_{1c}.

However, SMBG in this setting will continue to have no impact on metabolic control until educational programmes that facilitate patients utilising the results and adjusting their treatment accordingly are put in place. The authors acknowledge this and also suggest that physicians do not fully utilise the results.

For me, this paper highlights that unless we address both of these aspects, we will continue to see papers published that suggest SMBG in type 2 diabetes is ineffective.

'SMBG in this setting will continue to have no impact on metabolic control until educational programmes that facilitate patients utilising the results and adjusting their treatment accordingly are put in place.'



Martin Hadley-Brown,
GP, Thetford

The role of SMBG in non-insulin-treated patients is less clear than in those using insulin and its evidence base is remarkably weak. Intuitively, many patients and clinicians believe that it must be beneficial, but this and other papers suggest that is often not the reality.

In this paper, Franciosi et al demonstrate a lack of correlation between SMBG and better metabolic control in non-insulin-using patients with type 2 diabetes. There is perhaps a small reduction in the risk of hypoglycaemia amongst those using SMBG more frequently but even this failed to show statistical significance.

So how should these and similar findings affect our clinical practice? Why do patients perform SMBG and clinicians encourage it? Furthermore, why do arguments surrounding SMBG engender conflict? If the findings of Franciosi and others are the reality then maybe many of our patients will be relieved at not

having to undertake SMBG and its discomforts. I would still advocate the view that the ability to monitor their own progress through SMBG may be sufficiently empowering or reassuring to justify it for some individual patients, but surely we should look for evidence of this which is better than anecdotal.

As clinicians, our desire is to act on the best available evidence and to work with our patients towards the best achievable

outcomes. If SMBG is being used unnecessarily both clinicians and patients have much to gain from moderating its use, particularly if we can achieve a re-investment of any resources released for other priorities – such as structured education programmes, which are of proven benefit.

There is a clear potential for motives here to be misinterpreted. We must be clear that our advice is based on best appropriate practice, not simply a desire to reduce expenditure.

Finally, there still remains a requirement for large-scale randomised trials examining the role of SMBG in type 2 diabetes and these are still lacking.

'There still remains a requirement for large randomised trials examining the role of SMBG in type 2 diabetes'