

# Self-monitoring of blood glucose: The debate continues



June James

When Anton H. (Tom) Clemens invented the first blood glucose meter over 30 years ago (Mendosa, 1999), nobody could have predicted how important these devices would become in the lives of people with diabetes. Now that the practice of point-of-care blood glucose monitoring has become commonplace, the use of self-monitoring of blood glucose (SMBG) has continued to generate interest, concern and discussion. Areas of concern have been cost, the suitability of the technology for specific groups of people with diabetes, the impact of SMBG on clinical outcomes and the quality of testing.

## Clinical role of SMBG

While the ability to test their own blood glucose levels is valued by people with diabetes, there is little evidence to suggest that SMBG improves clinical outcomes. Recently, Nauck et al (2009) compared daily urine glucose testing and SMBG (four times, once weekly) in people with type 2 diabetes on insulin, with or without oral antidiabetes drugs (OADs), and found no improvement in glycaemic control in those receiving conventional insulin therapy using SMBG. Among those on OADs alone, Logtenberg et al (2009) concluded that there was no evidence to suggest that SMBG impacted positively on quality of life or treatment satisfaction.

However, neither Nauck et al (2009) nor Logtenberg et al (2009) provided patient education on dose adjustment following SMBG as part of their study designs. Diabetes UK (2006) hold that without patient education to know when and how to test, and what to do with the results, there is little point in SMBG. When supported by appropriate patient education, it is generally acknowledged that SMBG is beneficial to some groups of people with diabetes.

## Cost of SMBG

Until as recently as the 1970s, the cost of SMBG technology was prohibitive. People

with diabetes regularly cut test strips in half to make the packets last longer. Once available on prescription, there seemed to be an explosion of new technologies in the SMBG field, and this continues today. Companies are designing ever more complex testing systems that provide results faster, are packaged in more streamlined devices and use other technologies, such as computer downloading of results, to tempt the consumer.

However, there has been much debate about the cost to health services of SMBG, given its tenuous link to improved clinical outcomes. It is estimated that £90 million was spent on SMBG equipment in 2001 (Hoffman et al, 2002). To reduce both inappropriate SMBG and spending, many Trusts now have policies recommending that use of SMBG be limited to certain patient groups – this usually includes people with type 1 diabetes, or people with type 2 diabetes using sulphonylureas, insulin or other medications that increase the risk of hypoglycaemia.

While Trust policies may reduce the numbers of people with diabetes to whom SMBG is recommended by a healthcare professional, these people will continue to be able to obtain SMBG meters at local pharmacies. However, information about how to use the meters may be limited when they are purchased over the counter, and advice on how to interpret the results may be inappropriate or not provided.

## Quality concerns

There is growing concern about quality control for SMBG in both hospital and community settings. Incorrect SMBG results can lead to inappropriate medication changes and compromise patient safety.

The US Food and Drug Administration (FDA, 2009) recently warned against the use of glucose dehydrogenase pyrroloquinoline quinone (GDH-PQQ) glucose test strips in people concurrently using therapies that contain certain sugars other than glucose,

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including maltose, galactose and xylose. In practice, this affects those on peritoneal dialysis and people who have recently had surgery. The use of GDH-PQQ strips in these populations may give falsely high blood glucose readings, potentially leading to inappropriate increases in insulin doses. Many of the SMBG meters currently available in the UK use GDH-PQQ strips, although some companies are moving toward non-GDH-PQC technologies.

Concerns have also been raised around glucose monitoring quality assurance programmes for ward staff; therefore, some hospitals are using audits to identify gaps in their service.

### Conclusion

SMBG is a fantastic tool that assists people with diabetes, and healthcare professionals involved in the management of diabetes, to track and record changes in glycaemic control. However, SMBG should only be suggested for use by those who have clinical need of the technology. Furthermore, appropriate training and education must be provided to support the correct use of the meters and interpretation of the results.

A UK-based study based using a structured education programme to assist people with diabetes to interpret and act upon blood glucose meter results is currently taking place. Watch this space! ■

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