Self-Monitoring of Blood Glucose for people with type 2 diabetes not treated with insulin

Background

Healthy Living NT, incorporated as the Diabetes Association of the NT Inc., is a community based, charitable organisation dedicated to improving the lives of people with diabetes in the NT. Healthy Living NT provides a range of services to people with diabetes including support, advocacy and extensive formal diabetes education services delivered by appropriately qualified diabetes nurse educators and dietitians. Healthy Living NT is also the Agent for the National Diabetes Services Scheme (NDSS) in the Northern Territory.

This submission addresses the utilisation and patterns of use of self-monitoring of blood glucose (SMBG) and the clinical outcomes and benefits of SMBG for people with type 2 diabetes not treated with insulin. Healthy Living NT is not a research or clinically based organisation; hence our observations below are based on our experience in working with people with diabetes since 1980, delivering diabetes education to the widely differing demographic population of the NT since 1989 and delivery of the NDSS since 1987. Our submission is not intended to provide a review of clinical evidence or offer medical opinion; rather, we provide our opinion based on experience and a range of equally valid consumer perspectives on the value of SMBG.

The NT population has a number of differentiating characteristics that influence access to health services, health status, and diabetes management:

- A relatively small population of ~230,000 spread over a huge land mass equivalent to 1/6 of the Australian continent.

- The majority of the population (~65%) is based in the two major urban centres (Darwin and Alice Springs). The remainder of the population is widely distributed in small regional towns and throughout remote communities across the NT. For those living outside major urban centres, access to systematic and consistent health services such as diabetes education is reduced with every increment of remoteness.

- In excess of 30% of the NT's population is indigenous; of this, approximately 80% live remotely, outside major urban centres in remote locations, small communities and outstations throughout the NT. The indigenous community experiences a considerably higher prevalence of type 2 diabetes than the national average. This community (particularly those who live remotely) is characterised by exceedingly low socio-economic status and a low level of western health literacy.

Observations

- **Utilisation and patterns of use of SMBG**

If viewed as a single homogenous group, there are inconsistent and widely variable utilisation and patterns of use of self-monitoring of blood glucose (SMBG) for people with type 2 diabetes not treated with insulin:

- Some people SMBG on a regular and consistent basis (often daily) as a means of enhancing their diabetes self-management and blood glucose control. These people have a high level of health literacy and are generally able to interpret the results of SMBG and the linkage to modifiable lifestyle factors such as diet and exercise, medication impacts or need to consult their GP or diabetes educator.
- Some people SMBG on a less regular or sporadic basis as a means of checking their blood glucose control, when they are feeling unwell or when they perceive variation occurring in their level of diabetes control. These people may also interpret the results of SMBG and the linkage to lifestyle factors such as diet and exercise, medication or need to consult their GP or diabetes educator.
- Some people commence SMBG on initial diagnosis for a period until they are confident in understanding their blood glucose levels and the factors that impact on them. This level of SMBG is often conducted in association with formal diabetes education.
- Some people SMBG simply because their GP has 'prescribed it', and may not use the results (or understand the results effectively) to modify lifestyle factors or access relevant health services in a timely manner. In this case, the effectiveness of SMBG is largely determined by the treating health professional and their ongoing review of a person's results.
- Some people SMBG but find it distressing, with variable results causing increased levels of anxiety which, in itself, can be detrimental to optimum diabetes control. These people may or may not access relevant health professionals regarding these SMBG results.
- Some people do not SMBG at all, potentially relying on quarterly HbA1c tests to assess the effectiveness of blood glucose control. Reasons underlying this decision may range from:
    - a personal decision that SMBG is not relevant/appropriate, sometimes coupled with a view that HbA1c testing is as effective as SMBG and less intrusive. Some people may also find the physical process of doing their own SMBG unpleasant, and therefore not test;
    - a decision by the person's Medical Officer that SMBG (for whatever reason) is unlikely to be useful, achievable or efficacious.

Data (both national and jurisdictional) confirming the relative proportions of people with non-insulin requiring type 2 diabetes as per their SMBG regimen should be readily available from the National Diabetes Services Scheme database, administered by Diabetes Australia Ltd on behalf of the Department of Health and Ageing.

Given that people with type 2 diabetes not treated with insulin are <u>not</u> a single homogenous group, this range and variation in SMBG is therefore not surprising and is wholly consistent with various clinical guidelines. Healthy Living NT supports the:

- NHMRC recommendations:
    - *"Glycated haemoglobin (HbA1c) measurement should be used to assess long term blood glucose control. (Grade A)*

> ➢ *Self monitoring of blood glucose (SMBG) should be considered in all people with type 2 diabetes but the decision to perform SMBG, and the frequency and timing of testing, should be individualised. (Grade C)"* [1]

- Australian Diabetes Educators Association contention that:

  "Appropriateness of self blood glucose monitoring be assessed on an individual basis, taking into consideration the person's disease and co-morbidity status, age, culture, dexterity and physical and intellectual capabilities, identified glycaemic targets, current medication regimen, potential confounders that may interfere with the accuracy of results obtained, and level of motivation." [2]

Healthy Living NT believes that (western) health literacy and environmental capacity should also be major additional factors when determining the relevance of SMBG to a person with type 2 diabetes not treated with insulin. This view is consistent with the *CARPA Standard Treatment Manual.* CARPA is a clinical manual for primary health care practitioners in remote and rural communities, and is the primary clinical guideline standard in operation across most of the NT:

> *"Self-monitoring of blood glucose is only needed in younger people for a short time to guide changes in drug treatment, and only for some people on insulin".* [3]

The *CARPA Reference Book* further states that:

> *"Self-monitoring is useful for adjusting insulin requirements. For those not needing insulin it is unlikely to be useful unless it leads to changes in lifestyle, treatment, motivation or sense of control."*
>
> *"The benefits (of SMBG) for patients with type 2 diabetes in relation to quality of life remain to be proven. No matter how hard some patients try to achieve glycaemic control, their blood glucose values continue to fluctuate in an alarming way. This can lead to despair and learned helplessness."* [4]

Clinical outcomes and benefits of SMBG

The clinical outcomes and benefits of SMBG for people with type 2 diabetes not treated with insulin need to be considered separately. Clinical outcomes are generally population health based, focussing on overall results for a community. However, "benefit" needs to be considered in a broader sense and, because people with type 2 diabetes are not a single homogenous group, in an individual context.

The clinical outcomes of SMBG for people with type 2 diabetes not treated with insulin are not clearly defined. Numerous Australian and international studies fail to distinctly demonstrate the clinical efficacy of SMBG for people with type 2 diabetes not treated with insulin. For example, a recent study reported in the British Medical Journal concluded that:

> *"Evidence from this meta-analysis of individual patient data was not convincing for a clinically meaningful effect of clinical management of non-insulin treated type 2 diabetes by self monitoring of blood glucose levels compared with management without self monitoring, although the difference in HbA1c level between groups was statistically significant. The difference in levels was consistent across subgroups defined by personal and clinical characteristics".* [5]

However this meta-analysis did show an <u>average</u> reduction in HbA1c of -0.25% for those people who SMBG - potentially not significant in a clinical trial or a cost benefit analysis, but very significant in terms of improved quality of life and reduced complications development for the people with diabetes who achieved a significant reduction. Studies show that a 1% decrease in

HbA1c is associated with a significant reduction in complications such as end stage renal disease, amputation, proliferative retinopathy and heart attacks. [6]

Additionally this meta-analysis, due to limitations in the studies considered, could not assess the efficacy of SMBG in younger people with type 2 diabetes. As the growing trend is for people to be diagnosed with type 2 diabetes at a younger age, there is an associated increase in 'life years of disease' and 'lost years of life'(DALYs). This is also associated with an increased impact on the health system due to a person living with the development of complications at a younger age. The opportunity for people in this emerging high-risk group to achieve better diabetes management with SMBG from the time of diagnosis will assist to reduce the rate of complications development.

For the portion of people with type 2 diabetes who are not treated with insulin but who regularly SMBG as a means of enhancing their diabetes self-management and blood glucose control, SMBG can be of significant benefit. These people are generally able to interpret the results of SMBG and the linkage to modifiable lifestyle factors such as diet and exercise, medication impacts or need to consult their GP. For this group of empowered people, withdrawal of the option to cost effectively SMBG would undoubtedly:

- cause some people unnecessary mental anguish and anxiety through loss of control as SMBG has become part of their self-management regimen, and
- increase reliance on the health system as familiar and practical self-management tools have been removed.

Similarly SMBG can be highly beneficial for individuals on diagnosis to familiarise themselves with managing the condition or for people when they are feeling unwell or feel that their level of diabetes control is varying. The use of SMBG in these groups is an important tool to support self-management and intersection with health services at appropriate times.

Removal of cost effective options to SMBG could lead to a worsening of blood glucose control and quality of life for those people who currently SMBG in an effective manner. This would then result in greater reliance on the health system due to the accelerated onset of complications.

Effective SMBG has always been linked to self-management education for people with diabetes. For SMBG to be effective, it needs to be coupled with appropriate education to help with:

- technique
- timing and frequency of testing, based on individual assessment
- interpretation of results in the context of management and
- when to seek further medical or education support.

For other people, for a variety of valid reasons, SMBG is less effective, not beneficial and not an efficacious therapeutic option. It may also simply not be achievable within the context of a person's environmental capacity.

To the extent that (western) health literacy is a limiting factor in a person's ability to effectively SMBG, should not preclude access to culturally appropriate education about diabetes management and support for practical achievable means of working towards effective self-management. In these environments, SMBG can be a tool used effectively to enhance a

person's knowledge of the effects of their lifestyle choices and their direct impact on their BGLs. This can be a positive motivator for behaviour modification.

Diabetes is a progressive condition, affecting individuals differently at different times, but ultimately requiring increasing levels of lifestyle modification and therapeutic intervention over the continuum. As a person's diabetes progresses, it should be acknowledged that effective SMBG can be complementary to HbA1c testing, as it can identify highs and lows in blood glucose levels throughout the day, whereas HbA1c simply provides a 3-month average. Thus, a 'good' HbA1c result could ignore the fact that it is the result of range of highly varied BGL readings. Thus, SMBG is likely to have an increasing therapeutic value as a person's diabetes progresses, however the timing and effectiveness of this will depend on the individual.

To summarise:

People with type 2 diabetes not treated with insulin are not a single homogenous group – their backgrounds, capacity, socio economic status and health literacy are highly varied. Above all, diabetes will affect each individual differently.

For those people who elect to SMBG and use the results to monitor their diabetes control, modify lifestyle factors or access health services, SMBG can be a rewarding self-management tool that enhances well-being and sense of control and assists in the reduction of complications.

For other people, who simply SMBG and do not use the results to change their diabetes management, it is less efficacious. Similarly, for people with low levels of western health literacy, SMBG may not be achievable or is not valuable or efficacious and, in some cases, is detrimental where it is not linked with appropriate education.

Irrespective of whether blood glucose control is measured by SMBG or regular HbA1c testing (or the complementary combination of both), the need for accessible, culturally relevant and comprehensive diabetes and dietetic education is universal.

Healthy Living NT supports the decision of whether or not to SMBG, and the appropriate level of monitoring, to be an informed one made between an individual and their healthcare team.

References

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2. ***Use of Blood Glucose Meters***, Australian Diabetes Educators Association Position Statement, 2010
3. ***CARPA Standard Treatment Manual*** *4th edition,* Central Australian Rural Practitioners Association, 2003, Alice Springs
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5. ***Meta-analysis of individual patient data in randomised trials of self monitoring of blood glucose in people with non-insulin treated type 2 diabetes*** *BMJ 2012;344:e486 doi: 10.1136/bmj.e486; published 27 February 2012)*
6. ***Diabetes: the silent pandemic and its impact on Australia*** (Ed) Shaw J, Tanamas S. Baker IDI Heart and Diabetes Institute, Australia 2012.