Breaking down the barriers to good glycaemic control in type 2 diabetes: a debate on the role of nurses

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Introduction

Current projections from the International Diabetes Federation (IDF) estimate that the global prevalence of diabetes is set to rise to 380 million (7.1% of the total population) by 2025, with type 2 diabetes responsible for the vast majority of this rise.[1,2] Diabetes-associated hyperglycaemia can cause blindness, increase the risk of heart attack and lead to limb amputations.[3] These complications not only have a major impact on patients' lives, but also impose a major burden on healthcare systems worldwide.[1]

A body of evidence demonstrates the importance of good glycaemic control in type 2 diabetes. Consequently, a number of expert clinical guidelines that define optimal clinical practice for the management of diabetes emphasise the need to maintain blood glucose levels as close to euglycaemia as possible.[4–7] Glycosylated haemoglobin (HbA_{1c}), a test which represents the average blood glucose concentration over 2–3 months, is considered the gold standard in assessing blood glucose control and is integral to most clinical guidelines. Despite these guidelines, a number of barriers to achieving good glycaemic control remain, and in many parts of the world treatment is suboptimal.

This article discusses the importance of good glycaemic control and the evidence supporting the link between poor glycaemic control and diabetes-related complications. In addition, it provides an overview of current diabetes treatment guidelines and looks at potential factors that may explain the discrepancy between HbA_{1c} guidelines and actual HbA_{1c} levels in clinical situations. Finally, this article focuses on the key role that nurses can take as part of a multidisciplinary approach to improve the management of people with type 2 diabetes.

The importance of good glycaemic control

Several important studies have effectively demonstrated that an increase in HbA_{1c} levels can result in an increase in diabetes-related complications.[3,8–10] Reductions in fasting plasma glucose (FPG) and postprandial plasma glucose (PPG) levels are also implicated in reducing type 2 diabetes-related complications.[11]

Summary

The number of people with diabetes worldwide is projected to reach 380 million by 2025, with 90% of these cases attributed to type 2 diabetes. Diabetes can cause a range of long-term complications, including heart disease, stroke and blindness. Studies have shown that poor glycaemic control can increase the risk of developing these complications and guidelines have been developed that provide recommendations on how best to manage diabetes and encourage good glycaemic control. However, a number of barriers to achieving good glycaemic control remain and in many parts of the world treatment is suboptimal. It is generally agreed that glycosylated haemoglobin (HbA_{1c}) testing represents the best way to monitor blood glucose levels. Yet many doctors lack the time and resources required to implement recommended guidelines on HbA_{1c} monitoring. Consequently, patients have a lack of understanding of HbA_{1c} testing and do not achieve target levels. Nurses have an important role to play in treating diabetes. Evidence demonstrates that, through patient support and education, nurses have a notable, positive impact on the proportion of patients achieving HbA_{1c} targets. Given the epidemic proportions of diabetes worldwide, the importance of nurses in diabetes management is likely to increase further in the coming years.

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Key words

Glycaemic control; diabetes nurse specialist; glycosylated haemoglobin (HbA_{1c}); patient education; patient support

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The United Kingdom Prospective Diabetes Study (UKPDS) assessed 3867 people with newly diagnosed type 2 diabetes and compared the effects of intensive blood-glucose management (treatment with insulin or sulphonylurea) with conventional treatment (diet modification) on the risk of micro- and macrovascular complications. In the intensive group, patients were treated with the aim of achieving an FPG level of <6 mmol/L. Over a 10-year period, the mean HbA_{1c} level in the intensive group was 7.0% (6.2–8.2%), compared with 7.9% (6.9–8.8%) in the conventional group. The lower mean HbA_{1c} level observed in the intensive group was associated with a reduction in the incidence of any diabetes-related complication.[10]

Further analysis of the UKPDS data demonstrated that a 1% reduction in HbA_{1c} was associated with a 21% reduction in the risk of any diabetes-related complication. Specifically, it showed a reduction in myocardial infarction and microvascular complications, such as foot ulcers and blindness, by 14% and 37%, respectively.[3] A meta-analysis conducted by Selvin *et al.* confirmed the value of patient HbA_{1c} levels as prognostic markers for cardiovascular disease.[9] In this analysis, it was shown that for each 1% increase in HbA_{1c} there was a corresponding increase in the relative risks for cardiovascular disease (coronary heart disease and stroke), fatal coronary disease, and stroke by 18%, 16%, and 17%, respectively.[9]

Guidelines for optimal glycaemic control

It is clear from the evidence that good glycaemic control is crucial in the prevention of type 2 diabetes-related complications.[3,8–10] In light of these findings, a number of guidelines have been developed to aid nurses and other healthcare professionals (HCPs) to monitor and manage their patients' diabetes.[4–7] The guidelines stress the importance of monitoring blood glucose and provide suggested targets for HbA_{1c}, FPG and PPG that patients should achieve for optimal outcomes (Table 1).

Target HbA_{1c} levels do differ somewhat between the specific guidelines (Table 1), but in general a target HbA_{1c} level of between 6.5% and 7.5% is recommended. These guidelines also encourage regular monitoring of blood glucose levels. Recommendations from the American Diabetes Association (ADA) state that HCPs should measure HbA_{1c} levels at least twice a year in patients who are achieving their targets and four times a year for those who are not or have recently changed their treatment.[5] The current IDF guidelines recommend HbA_{1c} testing every 2–6 months depending on patients' glucose control and treatment.[6] Most guidelines also make recommendations for PPG, FPG (Table 1) and self-monitoring of blood glucose (SMBG).

Despite general agreement between international guidelines on targets, there remains some discrepancy between the ways in which HbA_{1c} is tested and reported between, and within, countries. There are currently more than 20 different methods in use for testing HbA_{1c} based on three different assay principles.[13] In an attempt to combat this problem, The International Federation of Clinical Chemistry and Laboratory Medicine (IFCC) has developed a reference system for HbA_{1c} to allow accurate comparisons of data from across the globe.[14]

The gap between guidelines and clinical practice

Despite clear evidence on the importance of glycaemic control and consensus on strategies to achieve it, there remains a significant gap

Organisation	HbA_{1c} Target/goal (%)	FPG Target/goal mmol/L	PPG Target/goal mmol/L
American College of Endocrinology/American Association of Clinical Endocrinologists[4]	≤ 6.5	<6.1	<7.8
American Diabetes Association[5]	<7.0	<5.6	<10.0[†]
Asia Pacific Type 2 Diabetes Policy Group[12]	6.5*	4.4–6.1	4.4–8.0
International Diabetes Federation[6]	≤ 6.5**	<6.0	<8.0
International Federation of Clinical Chemistry and Laboratory Medicine[13]	5.0	Not reported	Not reported
National Institute for Health and Clinical Excellence (England and Wales)[7]	6.5–7.5	Not reported	Not reported

*Defined as optimal
**Defined as low risk
[†]Peak postprandial capillary plasma glucose
HbA_{1c}, glycosylated haemoglobin; FPG, fasting plasma glucose; PPG, postprandial blood glucose

Table 1. Treatment targets and goals from diabetes management guidelines

between guideline recommendations and actual clinical practice. This suggests that millions of people with type 2 diabetes are living with poor glycaemic control and suffering from its complications. Separate studies in Europe, USA and Asia cite average HbA_{1c} levels well above those recommended in guidelines (Figure 1).[15–25]

As the worldwide prevalence of diabetes is projected to increase rapidly in years to come, it is important that we understand the reasons for the current shortfall in glycaemic control evident in many countries. A recent global survey was conducted to evaluate HbA_{1c} awareness, attitudes and behaviour among HCPs and patients with type 2 diabetes.[26] This survey revealed that while most HCPs agreed on the importance of HbA_{1c} testing for glycaemic control, the frequency of HbA_{1c} measurements varied between countries and was as low as once every 6–12 months in Poland, Sweden and the UK. Importantly, doctors cited a lack of consultation time to explain and test HbA_{1c} with patients.[26]

Consequently, a large proportion of patients had a lack of understanding of HbA_{1c} and were not aware of targets.[26] Most of the patients surveyed recognised the link between adherence to treatment and good glycaemic control. However, patients highlighted adherence to diet and exercise, glucose monitoring and medication as some of the most difficult aspects of living with diabetes.[26] Adherence to oral antidiabetic drugs (OADs) is as low as 36% in some cases for patients remaining on treatment for 6–24 months.[27]

Bridging the gap: the role of the nurse

It is obvious that a number of different barriers to good glycaemic control exist. These include a lack of patient understanding of HbA_{1c}, poor adherence to medication, diet
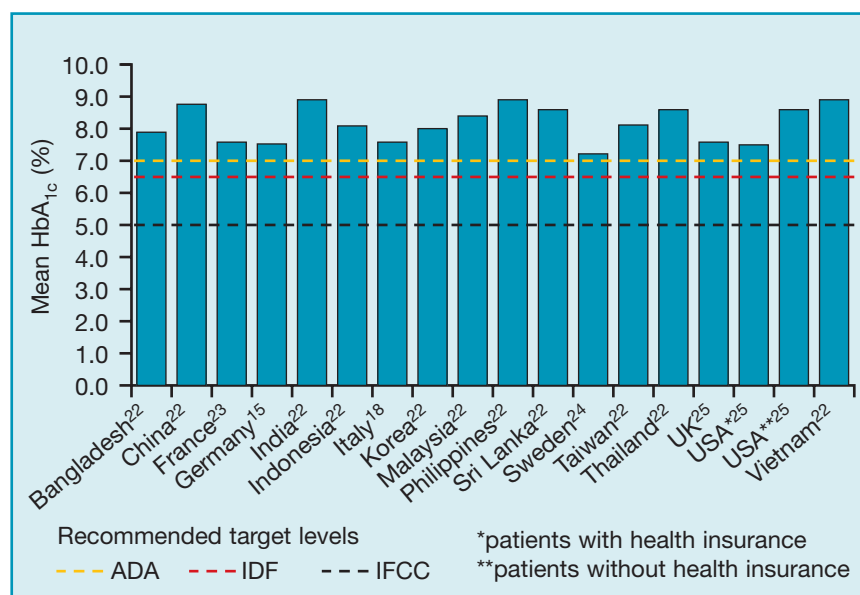

Figure 1. Reported mean HbA_{1c} levels in various studies worldwide, 2002–2006[15,18,22–25]

and exercise, and limited or poor communication between the patient and doctor. Nurses are well placed to help overcome these barriers by providing advice, education and support. It has been suggested that, in general, nurses are better positioned than physicians to educate and provide support.[28]

Findings from the Diabetes Attitudes, Wishes and Needs (DAWN) study have already highlighted the importance of the diabetes nurse, the efficacy of a multi-disciplinary approach and the need to educate both HCPs and patients.[29] Patients with a greater understanding of the importance of good glycaemic control and the risks of poor control are more likely to achieve target blood glucose levels.

In the UK, a patient-centred, group-based, self-management programme (X-PERT) was conducted where patients were invited to attend six 2-hour group educational sessions on self-management.[30] Results from this trial showed that after 14 months, the X-PERT group showed significant improvements in mean HbA_{1c} compared with the control group.[30]

Similarly, a recent study trialled the Living-Interactive-New-Distinguished-Activating (LINDA) education programme in patients with type 1 and type 2 diabetes.[31] This programme aimed to educate patients on the treatment options currently available and thus enable them to manage their diabetes more effectively. For patients with type 2 diabetes, the course involved up to 12 sessions (each lasting between 90 and 120 minutes covering topics including blood glucose self-monitoring and HbA_{1c}) run by diabetes nurses. After one year, patients with type 2 diabetes showed a mean HbA_{1c} level of 6.2% compared with 7.0% in the control group.[31]

There is an opportunity for nurses to become directly involved in patient education. Nurse-orientated education programmes have been shown to have a positive effect on patients' glycaemic control. One recent study looked at the role of nurses in a disease management programme (DMP). In the DMP, nurses performed a number of diagnostic and therapeutic tasks but with an emphasis on patient education and promotion of

self-management, and acted as the link between hospital-based endocrinologists and general practitioners.[27] The results from this study revealed that patients on the programme showed a significant improvement in HbA$_{1c}$ and the proportion of patients with poor glycaemic control decreased by 15%.[32]

Another study followed 159 patients who had received nurse-managed diabetes care, in which specially trained nurses had the responsibility for the care of diabetes outpatients.[33] Patients on the nurse-orientated programme showed a decrease in HbA$_{1c}$ levels of 3.2% compared with 2.5% in patients with standard endocrinologist-led care (p<0.001).[33] This suggests that nurse-led programmes can be effective in promoting good glycaemic control in patients.

Two recent studies showed that the level of contact and relationship between the patient and the diabetes nurse can have an important effect on treatment adherence and glycaemic control.[34,35] Both studies showed that patients who received regular telephone contact from a nurse who provided guidance and information on diabetes health had improved glycaemic control and greater adherence to diet and blood glucose monitoring, compared with controls.[34,35]

Breaking down the barriers: the role of nurses

Nurses have a variety of roles as part of a multidisciplinary healthcare team. Nurses are valuable in providing patient education and training but may also have a role in breaking down some other barriers to good glycaemic control.

By providing a link between patients and other HCPs and encouraging regular consultations with the healthcare team, nurses can promote the importance of good glycaemic control, increase the awareness of HbA$_{1c}$ and encourage regular HbA$_{1c}$ testing. More consultation time with nurses could provide patients with the extra support and advice they need to improve adherence to treatment. Nurses could also offer training for SMBG, and help patients interpret the glucose values, and thus promote self-management. These steps could relieve some of the pressure felt by other HCPs, but crucially, the particular skill set of the nurse could help improve the standard of treatment and ultimately improve glycaemic control in patients with type 2 diabetes.

Conclusions

It is well established that poor glycaemic control is a risk factor for diabetes-related complications. While current guidelines make recommendations for the best way in which to manage diabetes, it is evident that in many parts of the world glycaemic control is suboptimal.

A number of potential barriers to glycaemic control exist, including a lack of awareness of HbA$_{1c}$ by both patients and HCPs and a lack of consultation time for doctors to disseminate this information. As part of a multidisciplinary team, nurses are well positioned to help overcome these barriers. Nurses can act as a link between doctor and patient and can provide an extra level of support and practical advice. However, it is important to provide appropriate education and training to all HCPs and patients. Only then can nurses and other HCPs work towards providing the best care for their patients in an effort to achieve good glycaemic control for people with type 2 diabetes.

Acknowledgement

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