Numeracy skills in people with diabetes

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According to a survey carried out by the Organisation for Economic Co-operation and Development (2013), there are particularly large proportions of adults within England and Northern Ireland who have very poor numerical ability. Almost a quarter (24.1%) of those aged 16–65 years performed at or below the lowest level of proficiency (carrying out tasks that "require one-step or simple processes involving counting, sorting, performing basic arithmetic operations" or "understanding simple percents such as 50%").

The concept of health numeracy is one which has become more topical in recent years, particularly in relation to diabetes. Health numeracy is considered to be part of health literacy and is generally defined as the ability to understand and use numbers in daily life (Cavanaugh et al, 2008).

Although this concept is being studied more in clinical research, it is not one which readily features in the thinking and day-to-day interactions of clinicians. However, given the figures above and the likelihood that a significant proportion of those with poor numerical ability will also have a diagnosis of diabetes, perhaps it should be. There is a growing body of evidence that poor numerical ability may be significant in terms of the management of diabetes, as well as in other long-term health conditions.

What is the clinical impact of poor health numeracy?

In a review of the literature in 2011, Teft identified that poor numeracy skills contribute to poorer outcomes in many long-term conditions, including diabetes. In addition, it was identified that even in those with good literacy skills, and in those who may appear intelligent and articulate, there may still be poor numeracy skills, and that literacy and numeracy should be considered independently of one another (Teft, 2011).

The clinical impact of poor numeracy is demonstrated in poorer long-term health outcomes in people with HIV (Waldrop-Valverde et al, 2010), by poor anticoagulant control in those taking warfarin (Estrada et al, 2004), and in more frequent admissions in people with asthma and poorer adherence to therapy (Nelson et al, 2008). In diabetes, poor numeracy has been associated with worse perceived self-efficacy and self-care behaviours, as well as poorer glycaemic control (Cavanaugh et al, 2008). Indeed, it is a greater predictor of poor control in diabetes than is ethnicity (Osborn et al, 2009).

It is also important to recognise that poor numerical ability is not confined to patients, with several studies (Sheridan and Pignone, 2002; McMullen, 2010; Eastwood et al, 2011) identifying that the problem can be an issue in healthcare providers too.

How can patients with poor numerical ability be identified in clinical practice?

There are a number of tools used in research to identify those with poor numeracy skills (e.g. REALM [Rapid Estimate of Literacy Medicine], TOFHLA [Test of Functional Health Literacy] and WRAT-3 [Wide Range of Achievement Test, 3rd edition]); however, the most useful in everyday clinical practice may be the Diabetes Numeracy Test (DNT), which was developed and validated by a team at Vanderbilt University in 2008 (Huizinga et al, 2008). There are three versions of the test, the shortest and perhaps easiest to use in clinical practice being the five-question DNT. Lower scores of the test indicate poorer numerical ability. This can be downloaded by contacting Vanderbilt University directly via http://bit.ly/1O7BOTK. It should be borne in mind that the food labels used in the questionnaire look different from those used in the UK. That said, it is still a useful tool to quickly identify those who have poor numeracy skills.

How does poor numeracy affect consultations with patients?

During patient consultations, discussion of blood glucose values and sharing of blood results such as HbA_{1c} and other values is common, and indeed vital, in providing information and supporting patient empowerment. However, there may be people for whom this conversation is confusing at

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best, owing to a lack of understanding of what the values really mean.

In a recent study, Zikmund-Fisher et al (2014) demonstrated that those with poor numeracy may have a limited ability to understand information on glycaemic control. In this study, those with the poorest numerical skills found it difficult to identify if HbA_{1c} values were in or out of range. Nor were they able to determine whether the results were only slightly or significantly elevated. Indeed, the authors suggested that, in some cases, the data presented to participants with poorer numeracy skills was completely meaningless.

Structured education

It has long been understood that education is vital in empowering people to manage their own diabetes. Education may be provided in many ways, but structured education has become the norm in type 1 diabetes and, more recently, in type 2 diabetes too. NICE (2008) recommends that all individuals with diabetes be offered structured education at diagnosis, and for this to be ongoing as required. According to the NICE (2005) education guidelines (2005), structured education programmes should have a structured written curriculum, have trained educators, be quality assured and be audited. Guidance from Diabetes UK and the Department of Health (2005) also suggests that courses should cover the nature of diabetes, day-to-day management, specific issues, living with diabetes and sick-day rules. It is important when developing and delivering these programmes that attention is given to those who may have difficulty interpreting and understanding numbers, including in the written information that is provided.

Implications for clinical practice

Given that much diabetes management requires using numbers – for example, to understand blood glucose readings, calculate the amount of carbohydrate eaten at a meal, work out how much insulin to take, and work out how many tablets to take or simply when to reorder them – it is vital that there is cognisance of patients' abilities to use and understand numbers.

Explicitly questioning patients on what their HbA_{1c} and blood glucose values mean to them may change the whole nature of the conversation where it transpires that people are unable to relate the values to their own health status. This would allow a much more meaningful consultation to occur. Delivering structured education courses which specifically address the issues faced by those with poor numeracy may help improve patients' understanding and potentially improve long-term outcomes for this group.

A simple three-staged approach is suggested. Firstly, a recognition that some patients struggle with numbers is required; simply having that question in our minds when seeing patients may be of benefit. Secondly, identifying those who do have problems – either overtly using a simple questionnaire such as the five-question DNT or using subtle questioning to determine understanding – is important. Finally, adjusting conversations and delivery of information accordingly may have a huge positive impact on patients' understanding and, potentially, the management of their diabetes. ■

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