The benefits of flash glucose monitoring in the UK

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A century after the life-transforming discovery and purification of insulin, many people living with type 1 diabetes (T1D) are not reaching glycaemic goals.[1,2] Therapeutic approaches to help people with T1D achieve glucose targets and (equally importantly) reduce the burden of living with diabetes include structured education, new insulins and technology for delivering insulin, measuring glucose, decision support and closed loop technology to automate insulin delivery. The Freestyle Libre was first launched in Europe in 2014 with uptake in UK use having increased since it was made available on NHS prescription in 2017. There have been changes from the original device with the introduction of an algorithm to improve accuracy and the launch of the second generation Libre2 device allowing the optional use of alarms. Current UK T1D penetrance is around 50% in England (with a marked increase since April 2019 facilitated by NHS England as part of the NHS Long Term Plan), with higher rates in Scotland, Wales and Northern Ireland. A recent Health Technology Wales guidance has recommended broader use for all people with insulin-treated diabetes, not just T1D.[3]

Worldwide use is also increasing markedly. This global growth in the use of the Libre has occurred despite the lack of a supporting body of evidence from randomised controlled trials (RCTs) showing lowering of HbA_{1c}, the traditional outcome metric for diabetes trials.[4] For readers' interest, an RCT (FLASH-UK) has been examining this in the UK, with participants with T1D randomised to Libre2 versus control finger prick testing.[5] At the time of writing, FLASH-UK had just completed follow-up and the results are eagerly anticipated. Despite the current absence of RCT data, there are, however, many real-world observations showing improved clinical outcomes with the Libre.[6] In the UK, data show reductions in HbA_{1c} and a striking reduction in severe hypoglycaemia and diabetic ketoacidosis with use of the Libre in Scotland.[7] The Association of British Clinical Diabetologists (ABCD) has been running nationwide audits of medications introduced into real-world use in the UK since

2004. An ABCD audit of Libre outcomes has been running since 2017, reporting reduced HbA_{1c}, improved hypoglycaemia awareness and reductions in hospital attendances for dysglycaemia.[8]

This edition of the journal contains an examination of data from the ABCD Libre audit, asking whether prior structured education affects the outcomes with flash glucose monitoring. In particular, clinical outcomes were compared between those who had undergone Dose Adjustment for Normal Eating (DAFNE) structured education, other structured education or neither. Structured education to support self-management of T1D includes a variety of programmes across the UK and elsewhere with variable approaches/ quality assurance, evidence and governance/structure.[9] DAFNE is currently delivered in 99 centres and based on principles of therapeutic education with a written curriculum, multidisciplinary team working with defined accreditation, quality assurance and RCT and real-world evidence for efficacy.[10,11] This includes (but is not limited to) equipping participants with the ability to appraise and utilise glucose information judiciously.

A priori, it would have been possible to hypothesise that those undergoing structured education/DAFNE might be better placed to interpret and benefit from more comprehensive glucose data provided by the Libre. An alternative hypothesis would be that those who had undergone structured education had already part-benefited from the ability to interpret glucose information and would have less incremental gain from the Libre. Of note, there is a large repository of free online training (including the Diabetes Technology Network-UK resources cited in the paper) targeted specifically at how to use and interpret Libre data which would have been available to all regardless of previous structured education and, indeed, many services would have encouraged or even mandated evidence that people had undergone this more targeted training.

The study included 14,880 patients, stratified into three groups based on prior structured education status: 4,215 DAFNE graduates, 3,964 other structured education graduates and 6,701 patients who had not received structured education. The main outcomes were the impact of previous education on glycaemic control assessed by HbA_{1c} levels, and hypoglycaemia awareness measured by the standardised GOLD score. At follow-up, all three groups showed improvements from Libre initiation, with reduced HbA_{1c} (by 8.10 mmol/mol, 6.61 mmol/mol and 6.22 mmol/mol, respectively) and GOLD score (by 0.33, 0.30 and 0.34, respectively). There was no statistical difference between groups in terms of the magnitude of these changes (p=0.83 for HbA_{1c}, p=0.42 for GOLD). Interestingly, on linear regression modelling, the authors show that a higher baseline

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HbA$_{1c}$, frequency of flash monitoring and other structured education (but not DAFNE) were predictors of HbA$_{1c}$ reduction.

What does this mean for clinicians? Firstly, the authors and indeed all who have contributed to the ongoing ABCD audit are to be congratulated. This is an impressive repository of data. As with any real-world data, there are advantages and drawbacks compared with RCT data. Perhaps unsurprisingly, there were significant and clinically meaningful differences between groups. Those who had undergone DAFNE training were older with a longer duration of diabetes and insulin pump use. Readers should be cautious in assigning too much weight to group comparisons.

Taken together, we suggest that there are two key 'take-home' messages from this paper. First, it does not show that flash glucose monitoring means that structured education is now a vestigial offering. DAFNE in particular continues to empower people with T1D to self-manage their diabetes and, based on the supporting evidence, was the only structured education programme specifically cited in NICE NG17 T1D guidelines.[12] Second, although of critical importance, access to structured education should not be regarded as an impediment to receiving and benefiting from blood glucose monitoring technology. All groups benefited from FLASH with reductions in HbA$_{1c}$ and improvements in hypoglycaemia awareness scores. Not all are able to access and/or willing to commit time to undergoing structured education despite changes to make programmes like DAFNE more accessible including remote access. This paper clearly shows that this group still benefit from access to the Libre. We suggest that structured education and technology are complementary tools in the growing clinical armamentarium to support people living with T1D. The case for widespread use of flash glucose monitoring for all with insulin-treated diabetes across the whole of the UK continues to grow!

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