

Review Article

Structured Type 1 Diabetes Education Programs – An Unmet Need in Pakistan

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Background:

Structured type 1 diabetes education aims to teach the key self-management skills of carbohydrate counting and flexible insulin dosing, while developing a full understanding in the patient about type 1 diabetes, the action of basal and bolus insulin, management of illness and about the importance of complication screening to maintain long term health.

Structured type 1 education courses are not currently available in Pakistan and with the advent of modern technology use in the management of T1 diabetes, we need to train and upskill our people living with T1D. Insulin is the third most dangerous drug on the formulary and it is extremely important to ensure the safe use of this drug by our patients. It is crucial to develop and monitor such training courses in Pakistan.

We give a brief history and overview of structured type 1 education courses for people living with T1 diabetes.

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Inception of Structed Education Programs in T1 diabetes

Until the 1990s, people with type 1 diabetes were generally treated with twice-daily injections of insulin. They were advised to standardise their carbohydrate intakes as their insulin doses were generally fixed. With the advent of insulin pens, the use of multiple daily injections (MDI) using basal and bolus insulins gained popularity. Although MDI treatment allowed greater flexibility in timing and content of meals, its introduction coincided with a change in practice in the early 1990s, by which people

with type 1 diabetes were no longer taught to count carbohydrates and instead were encouraged to adopt “healthy eating” practices. Patient education focused on the techniques of blood testing and insulin injections, with some guidance on “sick day rules” but very little on diet. As patients were no longer taught about carbohydrates, patients on MDI regimens began to vary their carbohydrate intake despite relatively fixed insulin doses, leading to erratic diabetes control and high risk of hypoglycaemia.

By the late 1990s we were aware that many of our patients with type 1 diabetes were poorly trained or equipped to manage their condition effectively. We piloted interventions to teach carbohydrate counting and insulin adjustment and found good improvements in HbA1c levels and reduced hypoglycaemia in individual patients. In 1998, clinicians involved in diabetes care observed the Diabetes Teaching and Training programme, developed by Professor Michael Berger in Dusseldorf, Germany¹, and adapted much of the content to develop a programme which was to be delivered for one day a week, over four weeks (BERTIE ²) or five consecutive days (DAFNE). These courses are typically offered a year after the diagnosis of type 1 diabetes, because most of these patients are going through the honeymoon phase during this period ³.

In UK, structured type 1 diabetes education is a key part of the care pathway for patients during the second year following diagnosis, as well as for established patients referred for consideration for insulin pump therapy, or who have suboptimal HbA1c and / or recurrent hypoglycaemia, or who wish to improve their self-management skills.

Delivering a Structured Type 1 Education Course

Educators of these training programs are trained via our own training courses and undertake regular peer review. The programme is supported by a written curriculum, underpinned by the philosophy adopted by the Diabetes Education Network⁴. Each programme delivery is reviewed at regular educator meetings, where possible changes to content are discussed. The programs must meet NICE criteria⁵.

BERTIE chose to deliver course for one day over four weeks. They saw a potential benefit in participants putting their newly learned skills into practice in their everyday life, and undertaking homework between sessions, thus increasing the learning time from five days to three weeks. DAFNE is another evidence based structured type 1 education program in UK which is delivered over five consecutive days^{6,7}.

The BERTIE Program

BERTIE is facilitated by two trained diabetes educators (a diabetes specialist nurse and a dietitian). The first session begins with goal setting, to elicit, in as much detail as possible, what participants aim to gain by attending the course. The educators refer to these goals during the programme to tailor the learning to the needs of each individual.

Participants are asked to state their preferred target blood glucose level, to be used for the calculation of correction doses. Many participants express fear of hypoglycaemia and may therefore choose a relatively high target glucose level. In these cases, educators will encourage these to be lowered as the course progresses and as participants gain confidence in their ability to manage their diabetes without hypoglycaemia.

Increasingly, participants are already familiar with the principles of carbohydrate-counting and flexible insulin dosing as this is now routinely taught in our centre as part of routine care. If so, they enter the programme with their current insulin to carbohydrate ratio (ICR) and insulin sensitivity factor (ISF) for correction doses. Patients, who are on fixed insulin doses, generally start on an ICR of 1u:10g and an ISF of 3mmol/l, unless their total daily insulin requirement is less than 30 units, when smaller doses are advised.

Table 1 shows the topics covered during the programme. Carbohydrate estimation is covered in detail at each session. The aim is not to prescribe any particular type of diet or level of carbohydrate consumption, but to help participants learn how to estimate the carbohydrate content of their meals at home and when eating out, and to calculate appropriate bolus doses. The course covers the appropriate use of blood

glucose testing to optimise basal insulin doses, ICR and ISF, including adjustments required to manage the effects of exercise, alcohol intake and illness. Educators refer to lesson plans for each session and adapt these as required to meet the needs of participants.

At week 3, there is a session with a consultant clinical psychologist, who discusses how thoughts and feelings can affect behaviours and introduces the possibility that psychological factors may need to be addressed to help optimise diabetes self-management. A consultant physician leads a session on week 4, which covers the potential complications of diabetes, with an emphasis on screening and prevention, encouraging participants to take responsibility for ensuring screening is performed and to know their own results and what they mean.

In the week between sessions, participants are asked to put their newly learned skills into practice and to keep a diary of their food intake, glucose levels and insulin doses for four consecutive days. These diaries form the basis of feedback at the start of weeks 2 to 4 and provide an opportunity for participants to learn problem-solving skills in respect of their own data and from the experiences and opinions of fellow participants. Each session includes lunch, chosen from food brought in by the educators. To maximise the learning experience, the variety of foods increases as the course progresses, and in the final session, participants eat at the café within the venue. All participants are provided with a workbook which contains material relating to each part of the course.

Clinical Outcomes

Structured type 1 education courses were developed to to address the significant gaps in self-management skills in our patients with type 1 diabetes. From the outset their benefits in improving self-management skills became self-evident and since then, it has become a key part of our management pathway for type 1 diabetes.

These improvements result in less disruption to daily living, fewer diabetic emergencies, and fewer emergency admissions to hospital. Improved self-management benefits the diabetes care team who are less relied-upon to provide

ongoing reactive support to patients, enabling them to spend more of their time on education and proactive management. Reduced admissions represent a direct cost saving to the health care system. The improved self-management which accrues from these training courses also means that many patients, who had been considered as candidates for insulin pump therapy, no longer felt it was required.

Accurate calculation of bolus doses requires mathematical ability equivalent to a good GCSE pass¹⁹; the fact that most of these calculations are done by mental arithmetic will likely lead to inappropriate guesses at worst, or rounded-up estimates at best. It also means people are likely to use parameters which are easier to calculate, such as an ICR of 1u:10g. The use of a bolus calculator removes the need for 'manual' calculations, and hence enables more complex ratios (such as 1.2u:10g), and different ratios at different times of day, to be used, with beneficial effects on HbA1c¹⁹.

It is self-evident that regular self-monitoring of blood glucose is essential for optimal management of type 1 diabetes. There is a variety of reasons why patients may not perform sufficient blood tests in the longer term, even though they may have done so during a self-management course.

Many life-events can affect diabetes control acutely (such as stress or illness) or in the longer term (such as change in occupation or diet). Hence it is important to review day-to-day glucose control on a regular basis to determine whether the ICR or ISF need to be adjusted. This may require more frequent specialist follow up than is provided for by many clinics, especially where patients have been transferred to primary care for ongoing follow up.

Finally, we feel that self-management education should be an ongoing process, rather than a single intervention. It is also important to explore factors such as numeracy, self-monitoring frequency and dietary composition which may hinder optimal glycaemic control, and to use every consultation as an opportunity to review self-management practices and address outstanding learning needs.

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Table 1. Schedule for 4 sessions of the programme

Week 1	Week 2	Week 3	Week 4
Introduction and Goal setting	Feedback	Feedback	Feedback Review goals
What is diabetes	Carbohydrate counting	Psychological issues	Diabetes and long-term health
Action of insulin			
Introduction to carbohydrate counting		Carbohydrate counting – eating out / takeaways	Carbohydrate counting – Glycaemic index Alcohol
MEAL	MEAL	MEAL	MEAL
HbA1c	Hypoglycaemia	Hyperglycaemia and ketoacidosis	Travelling
Insulin adjustment		Management of illness	Pregnancy
	Managing exercise	Review of exercise	Reflection and evaluation
Set homework: - Consider personal goals - food and insulin diary	Set homework - Exercise diary - food and insulin diary - review ratios and basal insulin	Set homework - food and insulin diary - review ratios and basal insulin	