

X-PERT structured education programmes improve control in diabetes

Trudi Deakin

Article points

1. NHS reforms call for improvements in the quality of service provision within constrained finance.
2. Better diagnosis and management of diabetes would reduce diabetes-related complications and the economic burden diabetes places on the healthcare budget.
3. X-PERT Health's structured education programmes are well attended and have been shown to improve clinical, lifestyle and psychosocial outcomes in individuals with newly diagnosed and existing diabetes.

Key words

- Diabetes
- Improved self-care
- Structured education
- X-PERT programmes

Trudi Deakin is Chief Executive and Consultant Research Dietitian, X-PERT Health, Hebden Bridge, West Yorkshire.

The increasing prevalence of diabetes and the management of diabetes-related conditions place a strain on the healthcare budget at a time of financial stringency. Better self-management would improve glycaemic control as well as reducing the risk of complications. X-PERT Health's structured education programmes have been shown to improve clinical, lifestyle and psychosocial outcomes in people with newly diagnosed and existing diabetes. Additionally, they offer a cost-effective strategy in the treatment and management of this condition. Each programme consists of six weekly sessions lasting 2.5 hours that cover an extensive range of topics to improve knowledge and diabetes self-care. An audit was performed in January 2012 on data from 23 610 participants in X-PERT programmes. Results showed that participants were satisfied and empowered by the programmes, with improvements in HbA_{1c}, weight, body mass index, systolic and diastolic blood pressure, total, HDL and LDL cholesterol and triglycerides, as well as a reduction in diabetes medication.

The NHS reforms endorse the strapline “no decision about me, without me” and call for quality, innovation, productivity and prevention (Department of Health [DH], 2010). These reforms are an opportunity for healthcare organisations to improve the quality of services they deliver and, in doing so, improve the health and well-being of the nation. NHS efficiency savings have been proposed, aiming for a £15–20 billion saving between 2011 and 2014, and it is anticipated that these savings can only be achieved through quality improvements and advances in innovation (Nicholson, 2009).

The estimated prevalence of diabetes (diagnosed and undiagnosed) in people aged 16 and over in England is 7.4% (Association of Public Health Observatories, 2010). The prevalence of diabetes has now reached 3.75 million in the UK, with 2.9 million people being aware that they have the condition (Diabetes UK, 2012), adding to stress on the healthcare budget at a time of financial stringency.

Diabetes is a costly condition, taking up 10% of the NHS budget, and a significant part of this cost is attributable to inpatient care and treating diabetes-related conditions

(DH, 2012). Intensifying glycaemic control has been shown to reduce the onset of diabetes-related complications, but there is emerging evidence that achieving target blood glucose levels through prescribed diabetes medication may cause unwanted side effects or complications (Skyler et al, 2009). Although prescription costs for type 2 diabetes have increased by 89% between 1997 and 2007, glycaemic control (HbA_{1c}) has only improved by 0.1 percentage points, from 8.8% (73 mmol/mol) to 8.7% (72 mmol/mol; Currie et al, 2010).

The clinical and cost-effectiveness of structured education to improve diabetes self-management has been established (Norris et al, 2001; Deakin et al, 2005; Jacobs-van Der Bruggen et al, 2009). NICE (2008a) guidance states that all people at risk of, and diagnosed with, diabetes should have an opportunity to attend a structured patient education programme with annual follow-up. Up to 90% of people will access structured education if offered as an integral part of diabetes treatment and management (NICE, 2008b). The NICE quality standard defines personalised advice on nutrition and physical activity and structured education as specific quality statements (NICE, 2011). In England, 85% of primary care trusts (PCTs) report that they have contracts to provide structured education for people with newly diagnosed type 2 diabetes, and 76% report that these programmes are NICE compliant; however, only 66% of PCTs review whether all people newly diagnosed are offered structured education, and 48% of specialist providers report that they do not have the capacity to meet demand (Innove, 2012).

X-PERT Health's structured education programmes have been shown to improve clinical, lifestyle and psychosocial outcomes in people with newly diagnosed and existing diabetes (Deakin et al, 2006). Additionally, they have been demonstrated to be a cost-effective strategy in the treatment and management of diabetes (Deakin, 2011a), costing as little as £15 per participant (Deakin, 2011b). The X-PERT Prevention of Diabetes

(X-POD) programme was launched at the *Diabetes UK Annual Professional Conference* in March 2012 to meet the needs of those at risk of developing the condition.

What is X-PERT education?

X-PERT structured education programmes are delivered over 6 weeks by healthcare professionals who have trained as educators. The programmes are designed to increase participants' knowledge, skills and confidence to make informed decisions and self-manage their condition.

The X-PERT philosophy is supported by: discovery learning (Bruner, 1961); problem-based learning (Barrows, 1996); facilitative learning (Rogers, 1959); experiential learning (Kolb, 1984); the principles of adult learning (Brookfield, 2001); group education (Deakin et al, 2005); the patient-centred approach (Lacroix and Assal, 2003); and the empowerment model (Anderson and Funnell, 2000).

The X-PERT programmes include X-PERT Diabetes, X-PERT Insulin and X-POD. These structured education programmes deliver a range of topics to help people understand:

- Health and disease.
- Tablets and insulin.
- Food, nutrients and digestion.
- What health results mean.
- The benefit of physical activity.
- Weight management.
- The impact of blood glucose, blood pressure and blood cholesterol levels on long-term health.
- Self-management of diabetes.
- Special considerations regarding travel, insurance, driving and work.

Each programme consists of six weekly sessions lasting 2.5 hours; *Table 1* outlines an overview of X-PERT Health's structured education programmes.

The X-PERT programmes have been shown in a randomised controlled trial to improve clinical, lifestyle and psychosocial outcomes in white Caucasian and South Asian people with newly diagnosed and existing diabetes (Deakin et al, 2006). They have also been

Page points

1. The clinical and cost-effectiveness of structured education to improve diabetes self-management has been established; NICE (2008a) guidance states that all people at risk of, and diagnosed with, diabetes should have an opportunity to attend a structured patient education programme with annual follow-up.
2. X-PERT Health's structured education programmes have been shown to improve clinical, lifestyle and psychosocial outcomes in people with newly diagnosed and existing diabetes.
3. X-PERT structured education programmes are delivered over 6 weeks by healthcare professionals who have trained as educators. The programmes are designed to increase participants' knowledge, skills and confidence to make informed decisions and self-manage their condition.

Table 1. Overview of X-PERT Health's structured education programmes.

	X-POD	X-PERT Diabetes	X-PERT Insulin
	<i>Week 1: what is impaired glucose regulation, diabetes and blood glucose control?</i> Care planning: lifestyle experiment to address individual health profiles.	<i>Week 1: what is diabetes, digestion and blood glucose control?</i> Care planning: lifestyle experiment to address the diabetes health profile.	<i>Week 1: diabetes, insulin and healthy living.</i> Care planning: lifestyle experiment to address the diabetes health profile.
	<i>Week 2: weight management.</i> Energy balance, eating for health and physical activity. Care planning: lifestyle experiment to explore diet and physical activity levels.	<i>Week 2: weight management.</i> Energy balance, eating for health and physical activity. Care planning: lifestyle experiment to explore diet.	<i>Week 2: all about insulin.</i> Exploring insulin – onset, peak and duration, regimens and devices. Hypo-/hyperglycaemia. Care planning: activity to address specific challenges.
	<i>Week 3: carbohydrate and fat awareness.</i> The quantity (amount) and quality (type) of carbohydrate and fat in foods. Care planning: activity to explore individual carbohydrate and fat intake.	<i>Week 3: carbohydrate awareness.</i> The quantity (amount) and quality (type) of carbohydrate foods. Care planning: activity to explore carbohydrates.	<i>Week 3: know your carbohydrates.</i> Carbohydrate counting – estimation, calculation and reading food labels. Care planning: lifestyle experiment – counting the carbohydrates.
	<i>Week 4: reading and understanding food labels.</i> Traffic light system, guideline daily amounts (GDAs), nutritional claims. Care planning: activity to explore personal shopping lists.	<i>Week 4: reading and understanding food labels.</i> Traffic light system, GDAs, nutritional claims. Care planning: activity to explore.	<i>Week 4: inspiration for insulin.</i> Troubleshooting: strategies to take control. "Inspiration", the game to address special considerations when living with diabetes.
	<i>Week 5: my health check.</i> Healthy life for healthy results. Exploring body weight, waist size, blood glucose, blood pressure and blood cholesterol. Care planning: personal plan for health.	<i>Week 5: possible complications.</i> Hypo-/hyperglycaemia. Possible complications of diabetes and prevention. Care planning: lifestyle experiment to keep healthy.	<i>Week 5: "MATCH IT" – taking control.</i> A chance to document blood glucose, carbohydrates and activity. Share diaries, identify challenges and apply self-management troubleshooters.
	<i>Week 6: are you a diabetes prevention X-PERT?</i> X-POD game – re-cap and assess learning and health profile. Care planning to take charge and reduce the risk of developing diabetes.	<i>Week 6: are you an X-PERT?</i> X-PERT game – re-cap and assess learning and diabetes health profile. Care planning to take charge and self-manage diabetes.	<i>Week 6: are you an Insulin X-PERT?</i> Game: "MATCH-IT 24/7" to challenge real "living with diabetes on insulin" situations. Have the self-management challenges been addressed?

demonstrated to be a cost-effective strategy in the treatment and management of diabetes; it costs as little as £15 per participant and has the potential to reduce the NHS prescription bill by £367 million per year (Deakin, 2011a).

Structured education audit

Audit standards have been identified from the published randomised controlled trial and national targets (Deakin et al, 2006; NICE, 2008a). The following outcomes are recorded at baseline, 6 months and annually thereafter and entered onto the audit database: attendance, HbA_{1c} (mmol/mol), body weight (kg), body mass index (kg/m²), waist circumference (cm), blood pressure (systolic and diastolic; mmHg), lipid profile (total, LDL, HDL and triglyceride cholesterol; mmol/L) and prescribed diabetes medication. A medication increase is defined as commencing on, or an increase in oral hypoglycaemic agents (OHAs) or insulin; a

medication decrease is defined as a reduction in the type or quantity of OHAs or the number of units of insulin injected. The audit report presents the number of participants for each outcome and the mean value at each time point.

Educators also enter how many of the sessions were attended. The audit report demonstrates that 95% of participants attended at least one session, and 81% attended four or more sessions. Participant satisfaction is recorded by participants completing an evaluation questionnaire that scores the structured education programme for enjoyment, usefulness, degree of self-management obtained and impact on living with diabetes. The mean satisfaction score for each programme is calculated from the total questionnaire scores and entered onto the database; the mean participant satisfaction score was 95%.

Participant empowerment is assessed at baseline, 6 weeks and annually thereafter by participants completing a validated questionnaire (Anderson et al, 2003). The mean empowerment score is calculated for the group from individual questionnaires and is entered onto the audit database. The audit report provides the mean score for each time point and the percentage change from baseline, which is currently an increase in empowerment of 23% post-education and 26% at 1 year.

There are 57 licensed X-PERT organisations or clusters of organisations, and 40 (70%) have entered audit data. In order to ensure that the national implementation of the X-PERT programme continues to be clinically and cost-effective, continuous audit is conducted. Audit reports can be generated for any time period per programme, per educator, per organisation or for all participants and present the number of participants (*n*) and the mean values for each outcome. A recent audit of 23 610 people with diabetes further validates the X-PERT approach by demonstrating excellent attendance rates and highly significant results in line with the clinical trial results at 6 months and 1 and 2 years. *Table 2* presents the audit results for all centres.

Table 2. Audit results for X-PERT Diabetes and X-PERT Insulin.

Outcomes	Baseline (mean; <i>n</i> =20 804)	6 months (mean; <i>n</i> =4764)	1 year (mean; <i>n</i> =3409)	2 years (mean; <i>n</i> =435)
HbA _{1c} (mmol/mol)	60.8	54.6	54.0	53.0
Body weight (kg)	89.4	87.1	86.3	86.7
Body mass index (kg/m ²)	31.9	31.0	30.9	30.7
Waist circumference (cm)	103.4	101.8	101.0	101.1
Systolic blood pressure (mmHg)	134.1	133.1	132.9	132.5
Diastolic blood pressure (mmHg)	77.5	76.3	75.2	75.5
Total cholesterol (mmol/L)	4.5	4.2	4.2	4.1
HDL cholesterol (mmol/L)	1.2	1.3	1.3	1.3
LDL cholesterol (mmol/L)	2.5	2.3	2.3	2.1
Triglycerides (mmol/L)	1.9	1.7	1.7	1.7
Reduced diabetes medication from baseline (%)	0	27	47	38

Conclusion

Type 2 diabetes is considered a progressive disease characterised as a triad of insulin resistance, beta-cell dysfunction and impaired hepatic glucose production (Ramlo-Halsted and Edelman, 2000). The benefits of improved glycaemic control in reducing the onset of secondary diabetes complications has been established (Stratton et al, 2000), and it has previously been accepted that people will require increased prescribed diabetes medication over time to obtain target glycaemic control (UK Prospective Diabetes Study [UKPDS] Group, 1998). However, X-PERT Health suggests that the same results can be achieved through lifestyle and self-management; X-PERT Health's structured education programmes lead to health improvements and a reduced requirement for diabetes medication, which significantly improves individuals' quality of life and reduces the cost to the NHS. It has always been assumed that diabetes is a progressive condition (UKPDS Group, 1998), but there is now emerging evidence that this assumption is not true; if individuals make significant lifestyle changes, they can indeed halt and even reverse the progression of the condition (Pastors et al, 2002; Coppel et al, 2010; Andrews et al, 2011; Deakin et al, 2011a; Lim et al 2011). ■

Anderson RM, Funnell MM (2000) *The Art of Empowerment: Stories and Strategies for Diabetes Educators*. American Diabetes Association, Virginia

Anderson RM, Fitzgerald JT, Gruppen LD et al (2003) The diabetes empowerment scale-short form (DES-SF). *Diabetes Care* **26**: 1641–3

Andrews RC, Cooper AR, Montgomery AA et al (2011) Diet or diet plus physical activity versus usual care in patients with newly diagnosed type 2 diabetes. *Lancet* **378**: 129–39

Association of Public Health Observatories (2010) *Diabetes Prevalence Model: Key Findings for England*. APHO, York. Available at: <http://bit.ly/blg29M> (accessed 09.07.12)

Barrows HS (1996) Problem-based learning in medicine and beyond. In: Wilkerson L, Gijsselaers WH (eds). *New Directions for Teaching and Learning. Bringing Problem-Based Learning to Higher Education: Theory and Practice*, vol. 68. Jossey-Bass, San Francisco: 3–13

Brookfield SD (2001) *Understanding and Facilitating Adult Learning: A Comprehensive Analysis of Principles and Effective Practices*. Open University Press, Milton Keynes

Bruner JS (1961) The act of discovery. *Harv Educ Rev* **31**: 21–32

Coppel KJ, Kataoka M, Williams SM et al (2010) Nutritional intervention in patients with type 2 diabetes who are hyperglycaemic despite optimised drug treatment – lifestyle over and above drugs in diabetes (LOADD) study. *BMJ* **341**: c3337

Currie CJ, Gale EA, Poole CD (2010) Estimation of primary care treatment costs and treatment efficacy for people with type 1 and type 2 diabetes in the UK from 1997–2007. *Diabetic Med* **27**: 938–48

Deakin TA, McShane CT, Cade JE, Williams RD (2005) Group-based self-management strategies in people with type 2 diabetes mellitus. *Cochrane Database Syst Rev* CD003417. Available at: <http://bit.ly/L4aww9> (accessed 09.07.12)

- Deakin TA, Cade JE, Williams R, Greenwood DC (2006) Structured patient education: the diabetes X-PERT programme makes a difference. *Diabetic Med* **23**: 944–54
- Deakin TA (2011a) The diabetes pandemic: is structured education the solution or an unnecessary expense? *Pract Diabetes* **28**: 358–61
- Deakin TD (2011b) *X-PERT Costs: The Cost Effective Solution to Diabetes*. X-PERT Health, Hebden Bridge, West Yorkshire
- Department of Health (2010) *The NHS Quality, Innovation, Productivity and Prevention Challenge: an Introduction for Clinicians*. DH, London. Available at: <http://bit.ly/bN9mLb> (accessed 09.07.12)
- Department of Health (2012) *The Management of Adult Diabetes Services in the NHS*. National Audit Office, London
- Diabetes UK (2012) *Diabetes in the UK 2012. Key Statistics on Diabetes*. Available at: <http://www.diabetes.org.uk/Documents/Reports/Diabetes-in-the-UK-2012.pdf> (accessed 09.07.12).
- Innovate (2012) *DiabetesE: Seventh National Report*. Innovate, Manchester. Available at: <http://bit.ly/NbZM0i> (accessed 09/07/12)
- Jacobs-van Der Bruggen MA, Van Baal PH, Hoogenveen RT et al (2009) Cost-effectiveness of lifestyle modification in diabetic patients. *Diabetes Care* **32**: 1453–8
- Kolb DA (1984) *Experiential Learning: Experience as the Source of Learning and Development*. Prentice-Hall, Englewood Cliffs, New Jersey
- Lacroix A, Assal J-P (2003) *Therapeutic Education of Patients: New Approaches to Chronic Illness*. Maloine, Paris
- Lim EL, Hollingsworth KG, Aribisala BS et al (2011) Reversal of type 2 diabetes: normalisation of beta cell function in association with decreased pancreas and liver triacylglycerol. *Diabetologia* DOI 10.1007/s00125-011-2204-7. Available at: <http://www.diabetologia-journal.org/Lim.pdf> (accessed 17.07.12)
- NICE (2008a) Clinical Guideline 66: *Type 2 Diabetes. The Management of Type 2 Diabetes*. NICE, London. Available at: <http://www.nice.org.uk/nicemedia/pdf/CG66NICEGuideline.pdf> (accessed 09.07.12)
- NICE (2008b) *Patient Education Programme for People with Type 2 Diabetes*. NICE, London. Available at: <http://bit.ly/gYnfNu> (accessed 16.07.12)
- NICE (2011) *Quality Standards Programme: Diabetes in Adults*. NICE, London. Available at: <http://www.nice.org.uk/guidance/qualitystandards/diabetesinadults/diabetesinadultsqualitystandard.jsp> (accessed 09.07.12)
- Nicholson D (2009) *The Year: NHS Chief Executive's Annual Report 2008/09*. Department of Health, London
- Norris SL, Engelgau MM, Narayan KM (2001) Effectiveness of self-management training in type 2 diabetes: a systematic review of randomised controlled trials. *Diabetes Care* **24**: 561–87
- Pastors JG, Walsaw H, Daley A, Franz M, Kalkarni K (2002) The Evidence for the effectiveness of medical nutrition therapy in diabetes management. *Diabetes Care* **25**: 608–13
- Ramlo-Halsted BA, Edelman SV (2000) The natural history of type 2 diabetes: practical points to consider in developing prevention and treatment strategies. *Clin Diabetes* **18**: 80–5
- Rogers CR (1959) Significant learning in therapy and in education. *Educational Leadership* **16**: 232–42
- Skyler JS, Bergenstal R, Bonow RO et al (2009) Intensive glycaemic control and the prevention of cardiovascular events: implications of the ACCORD, ADVANCE, and VA diabetes trials. *Diabetes Care* **32**: 187–92
- Stratton IM, Adler AI, Neil HA et al (2000) Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): prospective observational study. *BMJ* **321**: 405–12. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/10938048> (accessed 09.07.12)
- UK Prospective Diabetes Study Group (1998) Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). *Lancet* **352**: 837–53