SADIE (Skills for Adjusting Diet and Insulin in East Sussex): Ten years on

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Article points

1. SADIE (Skills for Adjusting Diet and Insulin in East Sussex) is a structured education programme for people with type 1 diabetes.
2. The programme aims to provide people with the knowledge and skills to self-manage their condition.
3. A 10-year audit revealed that people who had taken part the programme had improvements in quality of life and clinical outcomes.

Key words

- Self-management
- Structured education
- Type 1 diabetes

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SADIE (Skills for Adjusting Diet and Insulin in East Sussex) is one of a number of locally developed structured education programmes for people with type 1 diabetes. It aims to provide people with the appropriate knowledge and skills to self-manage their diabetes. This article examines the outcomes of an audit carried out 10 years after SADIE first began. Comparing the 10-year audit outcomes to results of the 5-year audit, which was completed in 2011, will determine whether participants continue to benefit. SADIE participants (*n*=148) underwent an initial pre-assessment appointment before the programme commenced. Data, including HbA_{1c}, PAID (Problem Areas In Diabetes) score and body weight were collected. This was repeated at a 3, 6 and 12-month follow-up appointment. As with the 5-year audit, the results were positive and are outlined in detail in the article.

It is estimated that there are 4.5 million people in the UK living with diabetes, with approximately 10% diagnosed with type 1 diabetes (Diabetes UK, 2016). The cause is still unknown, with diagnosis mainly in children and adolescents (World Health Organisation, 2016).

People are encouraged to self-manage their type 1 diabetes by learning how to adjust their insulin doses according to the carbohydrate content of their food, as well as through exercise, sick-day rules and other lifestyle factors. NICE state that providing a structured education programme has benefits, including improvement of blood glucose levels (NICE, 2016). The NICE Guideline Development Group advise that the education programme must fulfil the NICE quality standards and that it is regularly audited.

The annual National Diabetes Audit for England and Wales measures the effectiveness of diabetes services against NICE quality standards. It demonstrates the importance of structured education by reporting the number of referrals and attendances, in order to encourage change and improve services (NHS Digital, 2017).

SADIE (Skills for Adjusting Diet and Insulin in East Sussex) is a five-day programme run over five consecutive weeks and is conducted four times a year in two centres in East Sussex. The aim is to have ten participants on each course and ask them to attend follow up appointments after 3, 6 and 12 months. The programme is facilitated by a DSN and Diabetes Specialist Dietitian (DSD), supported by the national Diabetes Education Network. All facilitators have been peer assessed before delivering a programme independently and fully understand the aims of the structured education programme.

Background

In 2004, a DSN and a DSD attended the Bournemouth Diabetes Education Centre. They received relevant training that enabled them to develop a structured education programme for people with type 1 diabetes. Following this, they developed SADIE. A 5-year audit was undertaken in 2010 to evaluate the impact on participant's glycaemic control, body weight and quality of life (Faulkner and Jackson, 2011). The results demonstrated that twelve months after attending SADIE, participants experienced a significant reduction in mean HbA_{1c} by 5.5 mmol/mol (0.5%). Weight remained neutral and quality of life had improved.

This was consistent with the 6-month outcome data from the DAFNE (Dose Adjustment for Normal Eating) study group (2002) and also the a 7-year follow up of DAFNE in Nottingham (Gunn and Mansell, 2012). In 2010, the DAFNE Study Group also demonstrated long-term benefits on HbA_{1c} and quality of life, but found that there was a small mean increase in weight of 1.5 kg after a 44-month follow up of three centres (Speight et al, 2010). They concluded, however that this may have been expected with age-related weight gain. An audit of DAFNE in Australia, however, found a slight decrease in mean weight from 75.1 to 74.2 kg after 12 months (McIntyre et al, 2010).

In 2014, the SADIE facilitators applied for SADIE to be accredited by QISMET (Quality Institute for Self Management Education and Training) to demonstrate that it met the NICE requirements for structured education (QISMET, 2010). This demonstrated that SADIE is evidence based and that it fulfils national recommendations. It is based on a sound philosophy and has a complete lesson plan. They also concluded that it is provided by appropriately trained facilitators who are regularly peer reviewed. It is also subject to regular audits (NICE, 2016).

The 10-year audit was undertaken as a follow up from the 5-year audit to determine if the results were the same or if there had been any relevant statistical improvement in the outcomes. The same outcomes were measured, which included glycaemic control, quality of life and mean body weight, so were directly comparable. The facilitators agreed that it was important to ensure that the results were consistent.

Weight neutrality is often an aim of structured education. Food freedom is promoted throughout SADIE and a concern of this is that it may lead to over-indulgence. It should not be assumed, however, that all participants wish to maintain their weight, as some may prefer to promote weight loss or weight gain. An additional consideration in this audit could therefore be whether SADIE enables participants to achieve their weight change aims.

Method

All participants included in the audit attended and completed a minimum of 80% of the 5-day programme. Data were collected and baseline observations were recorded before the start and then at 3, 6 and 12 months. The data included HbA_{1c} levels to assess glycaemic control. The PAID (Problem Areas In Diabetes) scale (Polonsky et al, 1995) was used to measure quality of life. Body weight was also recorded with the aim to demonstrate that dietary freedom did not lead to an increase in weight.

The number of participants included in the audit was 148, of which 71 (48%) were female and 77 (52%) were male. They were diagnosed with type 1 diabetes or Latent Autoimmune Diabetes of Adulthood (LADA). Participants who did not complete the course or who did not attend the three follow up appointments were excluded.

The Clinical Effectiveness Team of the local NHS Trust supported the audit by reviewing the data and it was statistically analysed by a PhD student at the University of Greenwich.

At the end of each programme participants are asked to complete a evaluation. The SADIE facilitators can then reflect on participants comments and consider if changes need to be implemented. Some of the comments are included later in the article.

Results

The data were initially screened for violations of assumptions. PAID and HbA_{1c} violated the assumption of normality (Shapiro Wilks: PAID

Page points

1. The data from the 5-year audit showed improvement in HbA_{1c} and quality of life scores, and this was consistent with the 6-month outcome data from the DAFNE (Dose Adjustment for Normal Eating) study group.
2. The 10-year audit was undertaken as a follow up from the 5-year audit to determine if there had been any relevant statistical improvement in the outcomes. The same outcomes were measured, which included glycaemic control, quality of life and mean body weight, so were directly comparable.
3. The data included HbA1c levels to assess glycaemic control. The PAID (Problem Areas In Diabetes) scale (Polonsky et al, 1995) was used to measure quality of life. Body weight was also recorded in kilograms.

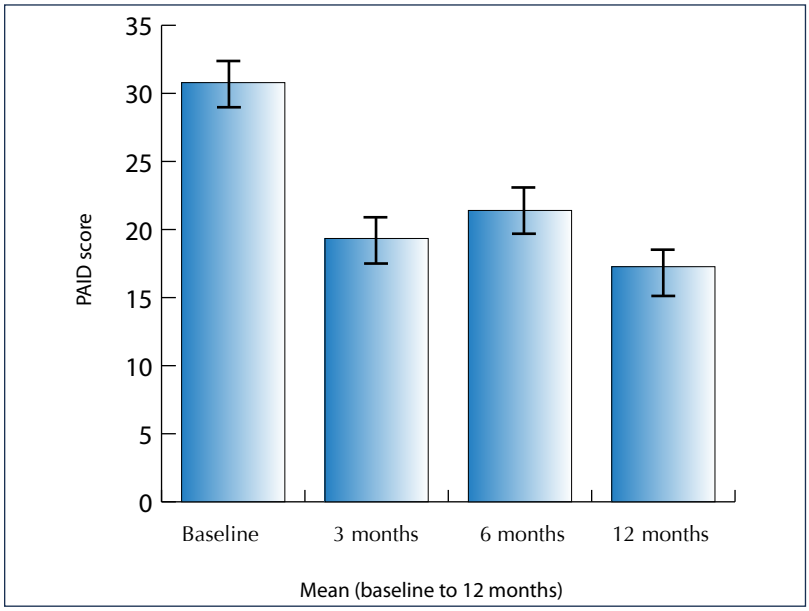

Figure 1. PAID (Problem Areas In Diabetes) score from baseline to 12 months.

12 months, P=0.003; HbA_{1c} baseline, P=0.003), thus the paired t-test non-parametric equivalent was conducted for both PAID scores and HbA_{1c} levels.

Comparison of baseline to 12-months follow up

The PAID questionnaire was completed at each of the time intervals. The results are shown in *Figure 1*, overleaf) A maximum score of 80 represents a poor quality of life, while a lower score is regarded as positive. A Wilcoxon rank test was conducted to compare scores at pre-assessment (zero time) to those at 12-months post SADIE; a statistically significant reduction was observed (Z=-6.35, P< .001).

Body weight was recorded in kilograms using digital stand-on weighing scales at each of the follow-up appointments. The results are shown in *Figure 2*. A paired t-test was conducted comparing pre-assessment (zero time) to 12 months post-SADIE, demonstrating weight neutrality as no statistical significant change in weight was revealed (t(74)= -0.59, P=0.560).

HbA_{1c} was also recorded at each appointment and the results are shown in *Figure 3*. A Wilcoxon rank test was conducted to compare pre-assessment levels to 12-months post SADIE, a statistically significant reduction in HbA_{1c} levels of 5.5 mmol/mol was revealed (Z = -3.85, P< .001).

Comparison of 5-year audit and 10-year audit

Comparisons of the data collected at the 5-year and 10-year audits were conducted. The data were recorded across four time intervals per wave, as outlined in *Figures 4, 5, 6,* overleaf.

The effect size for PAID scores from the 5-year audit (t=8.70) to the 10-year audit

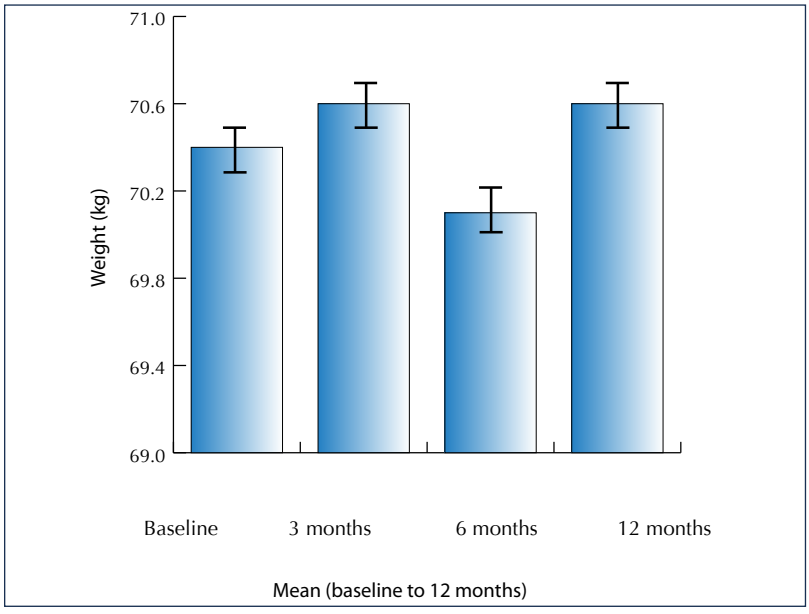

Figure 2. Changes in weight (kg) from baseline to 12 months post-course.

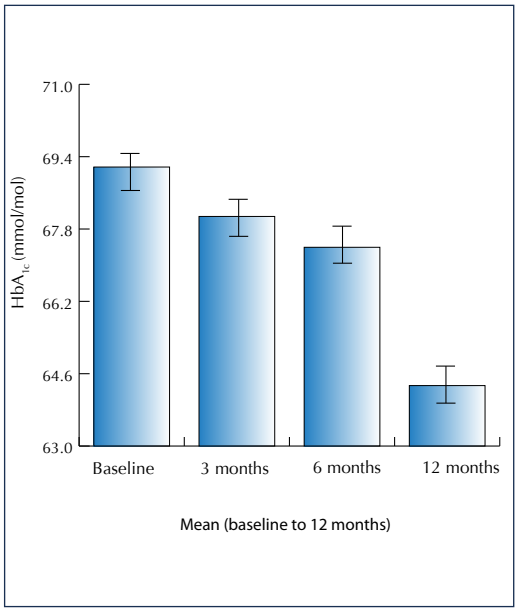

Figure 3. Reductions in HbA_{1c} after completing the course.

(t=9.00) indicates that although they yield a similar trend that suggests SADIE results in an increase in quality of life, baseline to 12 months, the 10-year audit had a slightly larger effect size.

A similar result was shown for the effect size for weight at 5 years (t=.164) to 10 years (t=.270), indicating that although both had a similar trend and both were non-significant, the 10-year audit results demonstrated a larger effect size (*Figure 5*). Comparisons of the effect sizes for HbA_{1c} (*Figure 6*) for both the 5-year audit (t=4.46) and the 10-year audit (t=4.43) were conducted. Although a similar trend was observed, the 10-year audit indicated a slightly larger effect size.

Discussion

According to Kiadaliri et al (2013), studies have shown people with diabetes generally have a worse health-related quality of life compared to those without diabetes and this is exacerbated by diabetes-related complications. This could be due to a combination of factors, including difficulty controlling diabetes, perceived effort of making lifestyle changes and sacrifices, fear of hypoglycaemia, lack of information and limited participation in decision-making (Pera, 2011). In addition, optimal glycaemic control and lower HbA_{1c} has been associated with better quality of life (Anderson et al, 2017).

This audit of the SADIE programme demonstrated an improvement in HbA_{1c} and quality of life 12 months after completing SADIE. This is consistent with the 5-year SADIE audit that is comparable to the NICE-accredited DAFNE programme. This success suggests that SADIE is an effective programme to provide education to support people to make informed decisions about self-managing their diabetes and reducing the burden.

The SADIE participants are asked to complete

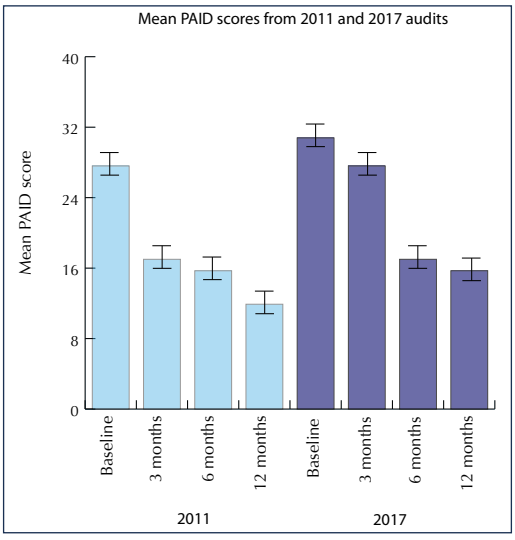

Figure 4. A comparison of PAID scores (2011 and 2017 audit).

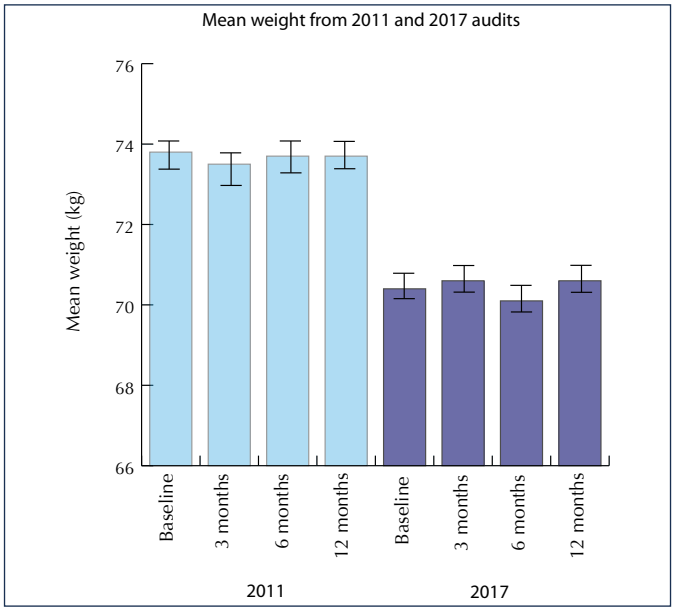

Figure 5. Comparison of changes in weight (2011 and 2017 audits).

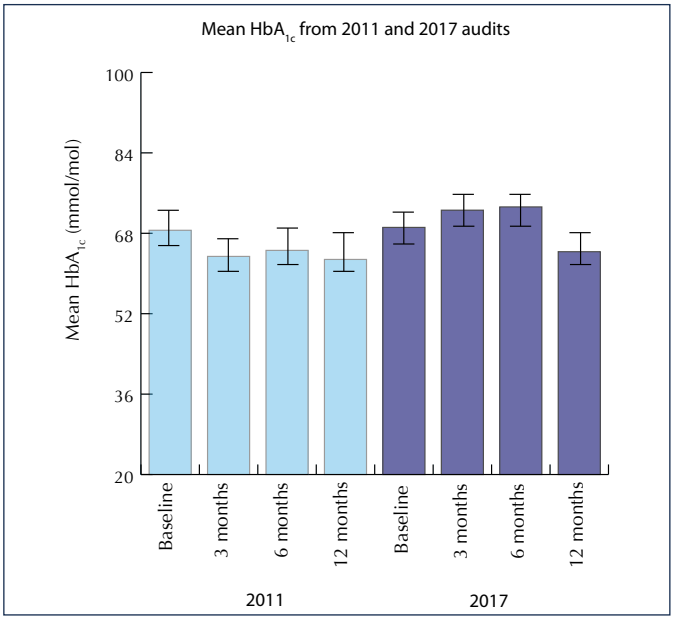

Figure 6. Changes in HbA_{1c} (comparison of 2011 and 2017 audit data).

Page points

1. It could be expected that a programme promoting food freedom would ultimately result in undesirable weight gain; however, this audit demonstrated that weight remained stable over the 12 month follow up period.
2. It should be acknowledged that following SADIE, some participants developed individual aims for weight gain or weight reduction, as opposed to weight neutrality.
3. Risks from the interpretation of other results were considered. Measuring glycaemic control could be misinterpreted, for example if an individual's rationale for participating in SADIE is to reduce episodes of hypoglycaemia, then HbA_{1c} may increase.

the local NHS Trust evaluation form at the end of the 5-week programme. The facilitators regularly assess the participant's comments and in response to these have implemented changes in order to improve the programme content. These are a few of their comments:

"I really enjoyed learning how diabetes works and what things effect my sugars. I've found I can manage my sugars better by looking at what I eat and what I'm doing."

"The whole SADIE course really explained and taught me a much better way of managing my diabetes. The way the course was set out, what was included and how it was delivered was brilliant."

"A thorough course covering all aspects of diabetes. It will enable me to manage it better in the future."

It could be expected that a programme promoting food freedom would ultimately result in undesirable weight gain; however, this audit demonstrated that weight remained stable over the 12 month follow up period, in line with the previous SADIE 5-year audit and DAFNE outcomes.

It should be acknowledged, however, that following SADIE, some participants developed individual aims for weight gain or weight reduction, as opposed to weight neutrality. Improved glycaemic control that comes with knowledge of carbohydrate counting, exercise and insulin dose adjustment, can enable participants to intentionally and safely change their weight. A discussion on healthy eating is included during the 5-week SADIE programme, to inform participants about general healthy dietary recommendations. Access to DSD also allows for individual needs to be addressed separately and tailored advice provided, if required.

SADIE facilitators were aware of any participant aims to promote weight gain or loss when they are encouraged to choose SMART (Specific, Measurable, Achievable, Realistic, Timely) goals at the end of the programme.

One participant, for example, had unintentionally lost a significant amount of weight prior to being diagnosed with type 1 diabetes, and therefore set a goal to increase their weight by half a stone (3.17 kg). After the year follow up they had successfully increased their weight by 3.6 kg, without detriment to blood glucose levels or quality of life, as evidenced by an improvement in HbA_{1c} from 54 mmol/mol (7.1%) to 51 (6.8%), and a PAID score reduction of 21/80 to 9/80.

Similarly, participants hoping to reduce their weight have more freedom and confidence to modify their dietary intake and increase physical activity levels without causing increased episodes of hypoglycaemia, due to knowledge of how to adjust insulin doses appropriately. Carbohydrate counting may also reduce the risk of people overestimating their insulin requirements with food. A subsequent reduction in frequency of hypoglycaemia may therefore help to achieve a reduction in daily calorie intake by eliminating the need to treat hypoglycaemia episodes with glucose and starchy snacks.

As previously mentioned, it would be useful for future audits to consider individual goals for body weight, as further measures could assess whether carbohydrate counting makes weight goals more achievable.

Risks from the interpretation of other results were considered. Measuring glycaemic control could be misinterpreted, for example if an individual's rationale for participating in SADIE is to reduce episodes of hypoglycaemia, then HbA_{1c} may increase. Blood glucose levels may be deliberately elevated for a temporary period in order to both improve awareness of hypoglycaemia and reduce episodes of hypoglycaemia. This is recognised as a positive outcome from people attending a type 1 education programme (Diabetes UK, 2016). Data collection at each of the follow-up appointments includes participant awareness of hypoglycaemia, although it was not considered in this audit. The facilitators will be considering this as a separate audit.

During the collection of the data required for auditing the facilitators were aware of the need to ensure participants attend the follow up appointments. Participants are informed that

they are expected to attend appointments at 3, 6 and 12 months at the beginning of the course, and flexibility in appointment venue, date and timing has helped reduce non-attendance.

Conclusion

When reviewing the 10-year audit outcomes, quality of life significantly improved in line with the previous 5-year audit. Weight remained stable, which was similar to the previous audit. The 10-year audit also observed a significant decrease in HbA_{1c} of 5.5 mmol/mol (0.5%) with a mean baseline of 69.17 mmol/mol improving to 64.34 mmol/mol after twelve months.

The 10-year audit demonstrated that participants who attended SADIE experienced an improvement in quality of life and clinical outcomes by improving HbA_{1c} level. This was as a result of teaching dose adjustment of insulin and carbohydrate counting. SADIE can help people with type 1 diabetes to gain more dietary freedom while remaining weight neutral, or may even enable people to intentionally increase or decrease their weight depending on their individual goal. Provision of accurate up-to-date information about diabetes by trained professionals, in a group setting that also enables people with type 1 diabetes to learn from each other, has been clearly demonstrated to improve clinical outcomes and quality of life after 12 months. This is expected to have longer-term health benefits for people with type 1 diabetes.

It can be concluded that 10 years on, SADIE continues to be an effective structured education programme that is developed and provided locally. It meets the criteria set out by NICE (2016) and it has been validated by QISMET. The facilitators are encouraged that the results from the 10-year audit continue to be comparable to DAFNE. It is anticipated the facilitators will continue to develop and deliver SADIE, and preparation is underway for the next QISMET review in 2018. ■

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