Carbohydrate counting and insulin dose adjustment group sessions for type 1 diabetes: a pilot of their effectiveness at a primary care diabetes centre

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Abstract
It is recommended that a structured group education programme such as DAFNE (Dose Adjustment For Normal Eating) is offered to all adults with type 1 diabetes. Such programmes teach the skills of carbohydrate counting and insulin dose adjustment with the aim of improving glycaemic control (HbA1c) without increasing the risk of hypoglycaemia.

South West Essex Community Services adult diabetes service was finding that individuals were not accessing the DAFNE programme for various reasons. A diabetes specialist dietitian and nurse decided to pilot the delivery of two 3-hour group sessions to teach some of the basic carbohydrate counting and insulin dose adjustment skills.

Changes in HbA1c pre- and post-intervention were reported for 68 subjects. The four different intervention arms compared were: those who attended just the carbohydrate counting session (n=14), those who attended both sessions (n=24), those who had attended one or both sessions and then went on to attend DAFNE (n=10), and those who had received no carbohydrate counting education (n=20).

Those who had attended one or both of the 3-hour sessions had a mean and absolute reduction in HbA1c compared with the group that had not received any education, although this was not statistically significant. The group that had attended one or both of the 3-hour sessions and DAFNE did achieve a statistically significant reduction in HbA1c compared with the group that had not received any education.

Despite several identified limitations to the pilot, it was felt that the delivery of the two 3-hour carbohydrate counting and insulin dose adjustment sessions demonstrated some clinically (if not statistically) significant improvement in HbA1c. Copyright © 2013 John Wiley & Sons.

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Key words
type 1 diabetes; carbohydrate counting; insulin dose adjustment

Background
It is recommended that all adults with type 1 diabetes are offered a programme of structured diabetes education.1 Such programmes have proven to reduce HbA1c without increasing the number of hypoglycaemic events.2 Improved quality of life and a reduction in hospital admissions with diabetic ketoacidosis or severe hypoglycaemia have also been shown.3 Allowing individuals the freedom to eat what they choose and still maintain good glycaemic control is the principal outcome for many of the education programmes. This is achieved by the teaching of skills in carbohydrate counting and insulin dose adjustment.

DAFNE (Dose Adjustment For Normal Eating) is the only NICE approved structured education programme for type 1 diabetes. It has been acknowledged that DAFNE can be delivered in both primary and secondary care settings.4 There has been much focus on transforming community services to help them deliver care for long-term conditions and to provide education that supports self-management.5

The adult diabetes service of South West Essex Community Service currently offers DAFNE, but was finding individuals were not accessing the programme for a number of reasons including: self-belief that they already knew how to carbohydrate count and adjust insulin doses appropriately; unwilling or unable to take the time off work; unable to attend due to family commitments; and individuals not liking the idea of being taught in a group.

Those unable or unwilling to attend were increasingly being referred to the newly-appointed diabetes specialist dietitian (DSD) for carbohydrate counting education. The key drawbacks of this were that...
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Method of analysis. The key method of analysis was the retrospective collection of pre- and post-intervention HbA1c from the online biochemistry reporting system. The aim was to obtain a pre-intervention HbA1c within three months of the start of the intervention and a post-intervention HbA1c after six months of the intervention. A Student’s t-test was used to test any statically significant change between pre- and post-intervention changes in the four groups.

Unfortunately, due to the retrospective design, the above data were collected for each individual at some point between one and 11 months pre- and post-intervention.

The HbA1c levels for the comparison group were those reported over a time frame similar to that of the other three groups.

Results

Figure 1 depicts the change in HbA1c mmol/mol pre- and post-intervention for the four groups.

Group 1, the carb counting only group, saw a reduction in mean HbA1c from 72 to 67 mmol/mol (range 53–90, SD 12.3). This change was not statistically significant (p=0.32).

Group 2, in which the 24 subjects had attended both sessions, saw a mean HbA1c reduction from 70 to 66 mmol/mol (range 46–89, SD 10.8). This change was not statistically significant (p=0.21).

The third group, who had attended one or both sessions and went on to attend DAFNE, had a mean HbA1c reduction from 78 to 66 mmol/mol (range 47–86, SD 11.7). This change was statistically significant at a confidence level of 90% (p<0.07).

The final, no input group, had a mean HbA1c increase of 73 to 74 mmol/mol (range 47–115, SD 17.4).

Figure 2 expresses the absolute change in HbA1c between pre- and post-intervention. The carbohydrate counting group had an absolute reduction of 7.1%. The group attending both sessions had a reduction of 6%. Those attending DAFNE additionally had a 15.7% reduction. The no input group had an absolute increase of 0.5%.
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Original practice point

Key points

- NICE recommends that all adults with type 1 diabetes should be offered structured group diabetes education programmes
- DAFNE is currently the only NICE recommended structured programme. DAFNE teaches the skills of carbohydrate counting and insulin dose adjustment over a period of five days
- The introduction of two 3-hour sessions to teach the basic skills of carbohydrate counting and insulin dose adjustment produced a clinically (if not statistically) significant reduction in mean and absolute HbA1c

Discussion

Diabetes glycaemic control improved in our group of individuals who attended one or both sessions of our two 3-hour carbohydrate counting and insulin dose adjustment groups compared with the group who had received no education from a DSD or group setting. In this pilot, the addition of attending DAFNE further improved reduction in HbA1c. This latter finding is in line with recent results from the DAFNE database which shows that the higher the starting HbA1c the greater the reduction.

There are numerous reasons why it is thought this may have occurred. These include: continual reinforcement of the principles of carbohydrate counting and insulin dose adjustment leading to a better understanding by the individual; relationships becoming more established between the diabetes team and the individuals; and those attending the sessions are those individuals ready to make changes to their diabetes care, thus more likely to be engaged in the education provided.

However, there are numerous limitations within this pilot noted by the authors. Firstly, the sample size was relatively small. As noted previously, the retrospective design meant that HbA1c levels were recorded between one and 11 months pre-intervention and a similar time frame post-intervention.

Studies into the effectiveness of structured education, such as those for DAFNE,4 ask for pre-intervention data no greater than three months pre-intervention and post-data at 12 months. The authors are aware that this range of data collection is not ideal and that this may be instrumental in the results achieved.

Another, perhaps useful, missing variable that could have been obtained is the participants’ duration of type 1 diabetes to see if this had an impact on the results achieved.

In addition, it was not noted if any other diabetes related intervention/education was received by any other health care professional on an individual basis during the pilot period.

Despite these limitations, it is still felt that the introduction two 3-hour carbohydrate counting and insulin adjustment group sessions has been beneficial and has shown to reduce HbA1c in this group of individuals.

Although there were limited statistically significant changes in HbA1c, it is felt that the pilot provided some new clinical information and highlighted some clinically significant changes about the effectiveness of a two 3-hour carbohydrate counting and insulin dose adjustment group education programme undertaken in primary care. It is felt that it demonstrates a cost-effective way of reducing HbA1c in the short term.

In future, we would like to continue the group and data collection using a larger sample and ensuring we make note of all interactions with diabetes health care professionals. We would also aim to collect HbA1c at more specific times pre- and post-intervention as well as at other time points, such as at six months, one year and two years post-intervention, to assess whether the benefits are ongoing. Additional data on the number of severe hypoglycaemic events (those requiring third-party assistance) and quality of life would also be desirable.

Declaration of interests

There are no conflicts of interest declared.

References

References are available online at www.practicaldiabetes.com.
References