Insulin initiation in the group and individual settings: An audit

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Article points

1. Commencing insulin in a group setting can be an effective use of a healthcare professional's time and provide good clinical outcomes in terms of HbA_{1c} and weight.
2. Choosing the most appropriate insulin to match an individual's lifestyle is key to reducing the rapid weight gain experienced with some insulin regimens.
3. Group education enables interaction with others in a similar situation and helps with maintaining weight loss.

Key words

- Education
- Insulin initiation
- Insulin regimens

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With national bodies citing the need for structured education for people with type 2 diabetes in a healthcare system of finite resources, it may be more cost and time effective to carry out such education in a group setting (DoH, 2003; NICE, 2003). A retrospective audit was conducted in Salford to review the benefits provided to people with type 2 diabetes commencing insulin in a group setting in the community who were given intensive education over a 4-week period. These data were then compared to those taken from individuals who initiated insulin in a one-to-one education session in the hospital setting, with a particular focus on changes in HbA_{1c}, weight and the impact of different insulin regimens.

Standard 3 of the NSF for diabetes refers to people being empowered 'to enhance their personal control over the day-to-day management of their diabetes in a way that enables them to experience the best possible quality of life' (DoH, 2001). In the author's experience, this can be achieved by the provision of education and psychological support. The NSF for diabetes also illustrates that people need appropriate knowledge, skills and an understanding of their condition before they are fully able to assess the risks associated with the condition and make appropriate behaviour and lifestyle changes.

In the past, people with diabetes received information on an individual basis. In the experience of the author, these consultations, while addressing clinical problems, are unlikely to induce long-term health behaviours, especially if the information conflicts with daily actions and habits. Meanwhile, group education provides individuals with a longer exposure to interactive techniques and people often identify with others in the group (Trento et al, 2002). Healthcare providers may also prefer group programmes as they allow for a larger number to receive education and the intervention becomes more rewarding than repetitive (Trento et al, 2002). In addition, group education programmes have become a recommendation from NICE (2003), the DoH (2003) and Diabetes UK (2005).

Weight gain is a common feature among those on insulin therapy and evidence shows that with metformin and insulin, in combination with dietary and lifestyle advice, this weight gain can be minimised (Aviles-Santa et al, 1999). Weight gain may be caused in part by increased hydration with insulin treatment, as individuals become less

symptomatic. However, fat is also gained, which is a risk factor for cardiovascular disease (Salle et al, 2004).

The author hypothesised that group education may help to reduce the amount of weight gained by people using insulin; this in turn would reduce the number of people presenting with associated complications and so could reduce the financial burden on the NHS.

Objectives

- To review the quantitative clinical outcomes (HbA_{1c} and weight change) of those commencing insulin on a community group programme at 3 months and at study end (December 2006).
- To compare group community 3-month data with the 1-year data from individuals attending one-to-one consultations held in secondary care.
- To review the clinical outcomes (HbA_{1c} and weight changes) of all individuals according to their insulin regimen.

Method

A retrospective audit of patient data was carried out using data collected between 2001 and 2006 for individuals seen in secondary care and between 2002 and 2006 for those seen in the community.

Baseline data on HbA_{1c} and weight were collected from group-educated individual over a 4-year period and were compared with individuals who were discharged from the hospital over the same time period.

Individuals in the community group undertook a 4-week structured education programme that included dietary and lifestyle advice plus practical demonstrations for managing their diabetes with insulin. They were supported via telephone following this programme until the group met for a follow-up meeting at 3 months to reassess their clinical parameters.

Individuals recruited from the hospital were those who had been discharged back to primary care and were receiving proactive telephone support via the Care Call service as part of their ongoing management. They had been given individual consultations with a DSN for education and support for their insulin regimen, however they were not routinely reviewed by a dietitian. Data for the hospital-educated arm were collected at baseline, 1 year and at study end.

Results

In total, information from 114 people with type 2 diabetes who received community-based group education was collected, as well as data from 110 individuals who were treated in a one-to-one setting in secondary care. *Table 1* shows mean HbA_{1c} and weight changes from baseline at the different points of audit for those in individuals education and those receiving group education.

The authors examined the different insulin regimens and related this to weight gain and reduction in HbA_{1c} (see *Table 2*). The results showed that people using insulin detemir either once or twice a day could achieve both weight loss and a reduction in HbA_{1c}. Similar findings were evident in those using insulin glargine; although the reduction in HbA_{1c} was greater the weight loss was not as great as in the detemir group. This data reflects the literature for the weight-neutral effects of insulin detemir (Hermansen et al, 2006).

When using isophane insulin individuals demonstrated reductions in HbA_{1c} and maintained the weight lost.

The results for those commenced on a mixed insulin, such as aspart or lispro, initially showed a rapid reduction in HbA_{1c} but this was not maintained in the long term.

Table 1. Mean changes in HbA_{1c} and weight throughout the audit.

Group education (community)		Individual education (hospital)	
HbA_{1c}	Weight	HbA_{1c}	Weight
Baseline		*Baseline*	
9.8 %	89.2 kg	9.14 %	92.2 kg
Change from baseline at 3 months		*Change from baseline at 1 year*	
-0.7%	-1.6 kg	-0.7 %	+0.9 kg
Change from baseline at study end		*Change from baseline at study end*	
-1.7 %	-1.3 kg	-0.1 %	-0.9 kg

Discussion

In the author's experience, many individuals who start insulin in the group setting who also have dietetic input see their HbA_{1c} initially decline and continue to do so after 3 months. These people can also experience weight loss, thus going against the current paradigm that people automatically gain weight on commencing insulin.

Previous studies have shown a 2 kg weight gain for every 1 % reduction in HbA_{1c} and 5.1 kg increase for a 1.5 % reduction in HbA_{1c} (Makimattila et al, 1999; Yki-Jarvinen et al, 1997; respectively).

The data presented in this article show that weight loss continued after the group intervention when there was continued support from the Care Call team. Larger et al (2001) provide similar data to that seen here, in that commencing insulin did not lead to weight gain, highlighting that insulin itself does not induce weight gain.

The continued weight loss achieved by some individuals may be attributed to the continued ongoing telephone support. This hypothesis is supported by Menard et al (2005), who showed that by providing intensive support to those with poorly controlled type 2 diabetes, people successfully met most of the national goals and personal targets set. However, 6 months after the support was withdrawn these individuals returned to usual care and the benefits vanished.

These results also compare well with existing evidence that those in group education share experiences and see better improvements in HbA_{1c} and weight than those seen on an individual basis (Rickheim et al, 2002).

Rosenstock et al (2001) showed that by using a long-acting insulin analogue people with diabetes experienced less weight gain compared to intermediate-acting insulin. These results were not evident in this audit, indeed it seems that with dietary support and intervention, the weight gain experienced with any insulin type can be minimised.

The rapid but unsustained reduction in HbA_{1c} in individuals who commenced on insulin aspart or insulin lispro could be related to the fact that use of these insulins were also associated with a rapid increase in weight over the first year. These data indicate that as HbA_{1c} declines quickly there is an associated increase in weight, which may lead to increased insulin resistance and associated cardiovascular risk.

Yki-Jarvinen et al (2000) showed that weight gain seems to be attributed to the frequency of insulin injections and can be counteracted by inclusion of metformin in the treatment regimen. Improved glycaemia reduces the basal metabolic rate to generate glucose. By continuing with metformin, energy intake is reduced, increased peripheral insulin sensitivity is seen and followed by increased hepatic gluconeogenesis (Ponssen et al, 2000). Overall, lifestyle intervention can counteract the altered basal metabolic rate with the correct insulin regimen.

Conclusion

Choosing the most appropriate insulin to match an individual's lifestyle is key to reducing the rapid weight gain experienced with some insulin regimens.

Alongside the correct regimen, providing education on food choices and lifestyle, alongside introducing metformin (if not already part of the existing regimen) with the longer-acting insulin analogues or an NPH insulin have the most positive effect in the long term on sustained weight loss and reduction in HbA_{1c}.

The key to giving people with diabetes the tools to empower themselves is to make sure they have the right insulin regimen, have a good knowledge of what lifestyle modifications may need to be made and have a good support network that can be accessed whenever it is needed. ■

Avilés-Santa et al (1999) *Annals of Internal Medicine* **131**: 182–8

DoH (2001) *National Service Framework for Diabetes: Standards*. DoH, London

DoH (2003) *National Service Framework for Diabetes: Delivery Strategy*. DoH, London

DoH, Diabetes UK (2005) *Structured patient education in diabetes: Report from the Patient Education Working Group*. DoH, London

Hermansen K et al (2006) *Diabetes Care* **29**: 1269–74

Larger E et al (2001) *Diabetes Care* **24**: 1849–50

Mäkimattila S et al (1999) *Diabetologia* **42**: 406–12

Ménard J et al (2005) *Canadian Medical Association Journal* **173**: 1457–66

Nelson M et al (2000) *Diabetic Medicine* **17**: 565–71

NICE (2003) *TA60 Diabetes (types 1 and 2) - patient education models: Guidance*. NICE, London

Ponssen HH et al (2000) *Clinical Therapeutics* **22**: 709–18

Rickheim PL et al (2002) *Diabetes Care* **25**: 269–74

Rosenstock J et al (2001) *Diabetes Care* **24**: 631–6

Sallé A et al (2004) *Diabetic Medicine* **21**: 1298–303

Trento M et al (2002) *Diabetologia* **45** : 1231–9

Yki-Järvinen H et al (1997) *Journal of Clinical Endocrinology and Metabolism* **82**: 4037–43

Yki-Järvinen H et al (1999) *Annals of International Medicine* **130**: 389–96

Yki-Järvinen H et al (2000) *Diabetes Care* **23**: 1130–6

Table 2. Impact of insulin regimen on change in weight and HbA_{1c} in the two treatment groups.

Regimen		Community	Hospital
Insulin detemir	n	50	18
	Baseline HbA_{1c} (%)	9.69	9.50
	Change from baseline at t1	-0.39	0.00
	Change from baseline at t2	-1.56	-0.81
	Baseline weight (kg)	88.8	92.9
	Change from baseline at t1	-7.0	+0.3
	Change from baseline at t2	-3.2	-1.4
Insulin glargine	n	11	13
	Baseline HbA_{1c} (%)	10.20	9.47
	Change from baseline at t1	-1.78	-0.84
	Change from baseline at t2	-2.59	-1.26
	Baseline weight (kg)	92.0	82.4
	Change from baseline at t1	-1.1	+2.4
	Change from baseline at t2	-1.4	-1.3
Insulin isophane (Insulatard)	n	32	33
	Baseline HbA_{1c} (%)	12.50	9.58
	Change from baseline at t1	-3.04	-1.17
	Change from baseline at t2	-3.60	-1.98
	Baseline weight (kg)	86.2	94.3
	Change from baseline at t1	-2.4	0.0
	Change from baseline at t2	-9.2	-1.3
Insulin isophane (Humulin I)	n	13	31
	Baseline HbA_{1c} (%)	10.2	8.62
	Change from baseline at t1	-1.74	-0.44
	Change from baseline at t2	No data	-1.22
	Baseline weight (kg)	89.7	94.6
	Change from baseline at t1	+11.3	+0.3
	Change from baseline at t2	+11.3	-1.7
Insulin aspart	n	6	11
	Baseline HbA_{1c} (%)	11.0	9.0
	Change from baseline at t1	-2.30	-1.40
	Change from baseline at t2	-2.00	-2.00
	Baseline weight (kg)	109.0	89.5
	Change from baseline at t1	+3.0	+4.2
	Change from baseline at t2	-8.0	+5.2
Insulin lispro	n	2	4
	Baseline HbA_{1c} (%)	9.45	8.60
	Change from baseline at t1	-1.65	-0.25
	Change from baseline at t2	No data	-1.10
	Baseline weight (kg)	95.4	93.4
	Change from baseline at t1	+8.6	-6.7
	Change from baseline at t2	No data	-6.2

t1= 3 months after initiation start of community group session, or 1 year after hospital-based individual session.
t2= End of audit period (December 2006)
†21 individuals changed to another insulin due to device changes and the need to improve glycaemic control.
‡Only 2 individuals have reached this next follow up period after the 3-month review