Management of transition to insulin therapy in type 2 diabetes

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Introduction

A questionnaire survey gathered information from DSNs on many aspects of the management of people with type 2 diabetes who transfer from oral hypoglycaemic agents to insulin therapy. The data revealed wide variation in practice across the UK in many areas, e.g. insulin type and dose, educational material and follow-up. Underlying reasons for this are varied. In some cases, it is clear that more research is needed. The survey findings are particularly relevant in view of the forecasted rise in insulin use in type 2 diabetes (UKPDS, 1996).

The United Kingdom Prospective Diabetes Study (UKPDS, 1996) has predicted an increase in the use of insulin in the management of type 2 diabetes because of the progressive nature of the disease. As a consequence, the workload of multidisciplinary diabetes teams will increase in terms of education and adjustment of therapy. For this reason, it is important to find the easiest and safest way to manage the transition from oral hypoglycaemic agents (OHAs) to insulin therapy, the ultimate aim being to achieve acceptable glycaemic control.

Methods

A questionnaire survey of hospital-based diabetes specialist nurses (DSNs) sought information to determine which insulin regimens were being used in the UK for people with type 2 diabetes in whom OHAs had failed. The survey also examined the follow-up procedure used by DSNs after they had initiated insulin, particularly areas of support, insulin dose increase and education.

In particular, answers were sought to the following questions:

- What type and dose of insulin are patients commenced on, and by whom?
- When and where are patients commenced on insulin?
- By whom and how are insulin doses altered?
- What follow-up do patients receive?
- Do nurses work from set guidelines/protocols for starting and adjusting insulin?
- What form of educational material is provided?

Questionnaires were sent to 290 hospital-based DSNs selected from the 1997 edition of the BDA's DSN Directory (BDA, 1997). Convenience sampling ensured representation across the UK.

Quantitative data, such as insulin dose and type, were analysed in terms of percentages. More open questions were used to elicit qualitative data such as follow-up care and dietary advice. The qualitative data were categorised into emerging themes and concepts, which were validated by an independent researcher. In this way, groups of concepts pertaining to the same phenomena can develop (Corbin and Strauss, 1990).

Respondents were asked to include samples of their guidelines, protocols and patient information, if produced independently.

Results

Type and dose

A total of 144 questionnaires were returned, giving a response rate of 50%. Responses were received from DSNs throughout the UK.

On average, one DSN covers a population of 50000–100000 people. Multiplying this figure by the number of returned questionnaires gives a figure of 7–14 million for the total population covered. This suggests that the data obtained from the sample are likely to be representative of the population with diabetes as a whole.

ARTICLE POINTS

1 A questionnaire survey revealed wide variation throughout the UK in the management of people with type 2 diabetes on insulin.

2 The questionnaire was sent to a representative sample of DSNs across the UK — a 50% response rate was achieved.

3 High differences were found in the type and dose of insulin used on commencement of therapy, the education provided, and DSN follow-up.

4 Further research is needed on many aspects of management.

5 It is essential to provide equity of access to care for all patients commencing insulin therapy.

KEY WORDS

- Questionnaire survey
- Type 2 diabetes
- Insulin therapy
- Education
- Follow-up

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Initiating therapy and education

As shown in *Table 1*, most centres (67; 47%) commenced patients on a pre-mix of soluble and isophane insulin. Many centres (45; 31%) commenced patients on either a pre-mix insulin or an isophane insulin. Most starting doses (56; 39%) were in the range 4–20 units twice daily.

Most centres (61) used more than one method of initiating the teaching of insulin therapy. Commencement of insulin therapy at the patient's home with a DSN was used by 111 (77%) centres. Other methods were commencement during a separate hospital appointment with a DSN in a diabetes care unit (86 centres; 60%); and during an outpatient appointment with the diabetes team after a physician consultation (26 centres; 18%).

Table 1. Type and dose of insulin at commencement of therapy

Insulin type	**No.**	**%**
Pre-mixed only	67	47
Pre-mixed or isophane	45	31
Isophane only	24	17
Other	8	5
Insulin dose	**No.**	**%**
4–20 units 2x/day	56	39
4-20 units 1x or 2x/day	17	12
6-20 units 1x day	12	8
No data	22	15
Variable	37	26

Table 2. Frequency of DSN follow-up

Follow up	**No.**	**%**
Not specified	54	38
Daily, weekly, monthly, then as required	29	20
Daily contact	21	15
Every few days, then weekly	15	10
Weekly	14	10
Twice weekly	9	6
No data	2	1

Table 3. Insulin dose adjustments: size of increase and method used to calculate increment (units or %)

Method	**Size**	**No.**	**%**
Units	1–6	110	76
	Other	20	14
Percentage	10–20%	12	8
No data	–	2	2

Follow-up

There was wide variation between centres with regard to DSN follow-up schedules, although 54 centres (38%) did not specify their schedule. The most common schedule combined telephone contacts, home visits or nurse clinic appointments, and frequency of follow-up was initially daily, then weekly, monthly, and finally 'as required' (29; 20%) (*Table 2*). Of the 50 centres that made daily contact, 15 contacted the patient more than once daily, stating that they visited the patient at home before each meal.

In the majority of centres (74; 51%), patients were followed up by the medical team 2–4 months after commencement of insulin.

Altering dose

Most centres (110; 76%) increased insulin doses by 1–6 units, mainly by 2–4 units (98 of 110 centres) (*Table 3*). All respondent DSNs altered insulin doses; however, only a small number of dietitians were altering doses (9; 6%).

Very few centres worked from a protocol or guidelines for starting and adjusting insulin (18 and 43, respectively). Although centres were asked to submit copies, there were too few (six) to permit useful comparisons to be made.

Only 51 centres (35%) had a minimum standard of education for commencement of insulin therapy (*Table 4*).

Educational material

Educational material was received from 15 of the 37 centres (26% of respondents) that produced their own. The submitted material ranged from short instruction leaflets to comprehensive booklets. Most submitted material consisted of information on diet, hypoglycaemia, HbA_{1c}, adjusting insulin, type 1 and type 2 diabetes and footcare. Eighteen centres used material provided by drug companies.

No educational material included any information to enable patients to adjust their own insulin. The authors' centre has produced a diagram, derived from their insulin adjustment guidelines, to illustrate the effect of different insulins in an isophane/soluble insulin regimen on glucose test results (assuming a free mixture of

soluble and isophane insulins) (Figure 1 is a representation of this diagram). In this way, dose adjustments can be made to the appropriate insulin. (More complicated regimens, e.g. more than two injections per day, will need specialist advice.)

Discussion

Historically, most patients starting insulin had type 1 diabetes and were not overweight. The methods developed for the initiation and titration of doses were designed for these patients (Walker, 1989). The realisation of the effectiveness of more frequent insulin use in type 2 diabetes suggests that protocols for the initiation of insulin may need modification.

Although 10 units of insulin may be an effective starting dose for a person with a body mass index (BMI) of 20, it would not necessarily be appropriate for someone with a BMI of 30 and marked insulin resistance. Holman and Turner (1985) developed a slide rule to overcome the problem of insulin resistance in overweight people with type 2 diabetes (it was used in the UKPDS for this purpose). The tool takes into account height, weight and fasting blood glucose levels and calculates 80% of the required insulin dose of a patient who transfers to insulin therapy. Basal and prandial insulin requirements are usually considered in a twice-daily regimen.

Commencing insulin therapy

The survey revealed wide variation in the type and dose of insulin and education programmes for patients with type 2 diabetes commencing insulin therapy. The choice is very much in the hands of individual diabetes departments, with consultants and clinicians having their own preferences. This perhaps reflects the lack of clear evidence on which insulin regimen is best for people with type 2 diabetes, especially in relation to patient acceptability and outcomes.

Insulin therapy was most commonly commenced at home with the patient, or at a separate appointment with a DSN at the hospital (after the initial consultation with the clinician when the decision to commence insulin was made). The effect on the patient of any delay in starting insulin therapy has not been studied. Some consider it unfair to leave a patient worrying about the thought of starting insulin, whether overnight or for a few weeks. This may be overcome through the use of a dummy or actual injection (Lewin and Seymour, 1992) at the clinician appointment if a DSN is not available. However, it could be argued that the time spent teaching a dummy injection may be better spent starting patients on insulin at home. The number of DSNs in a team will affect the availability of services to patients, especially commencement of insulin at home. The questionnaire did not examine which centres

PAGE POINTS

1 Protocols for the initiation of insulin in type 2 diabetes may need modification.

2 Traditional regimens do not consider high BMI or insulin resistance.

3 The type of insulin therapy is the choice of individual departments.

4 Delaying the initiation of insulin therapy following consultation may cause anxiety for the patient.

5 Tools can be used to assist the patient in altering their own insulin.

Table 4. Usage of protocols/guidelines and minimum standards among centres (N(%))

Protocol/guideline or standard	Yes	No	In process	No data
Protocol for initiating insulin	18 (12%)	118 (82%)	4 (3%)	4 (3%)
Protocol for adjusting insulin	43 (30%)	88 (61%)	9 (6%)	4 (3%)
Minimum standard for education	51 (35%)	90 (63%)	0	3 (2%)

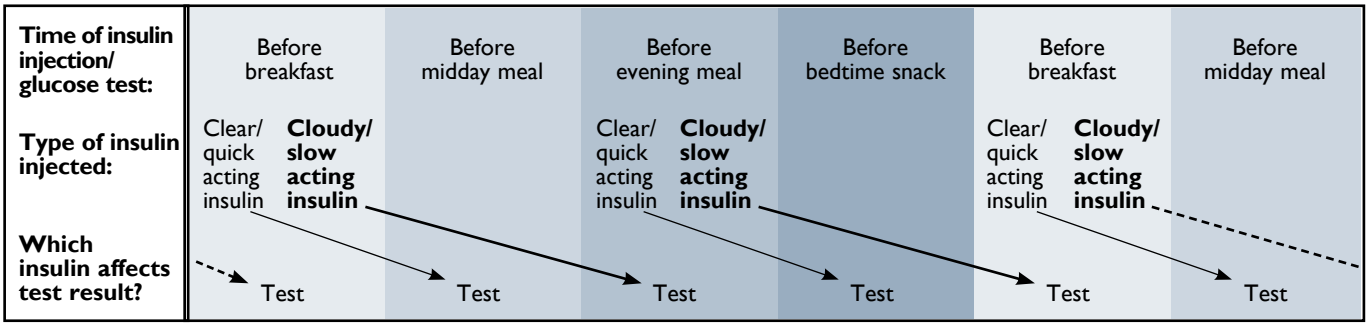

Figure 1. Diagram to show the influence of different insulins in a twice-daily isophane/soluble insulin regimen on glucose test results.

PAGE POINTS

1 Diabetes centres provide varying degrees of support for patients.

2 Insulin doses are increased using units rather than percentages.

3 Only a small number of dietitians alter insulin doses.

4 Educational material gave inconsistent information and advice.

5 Further research is needed on the effectiveness of follow-up by DSNs.

6 In the future, the role of the clinical diabetes educator may be developed.

started patients on insulin as hospital inpatients, a practice that remains common in some areas.

Follow-up

Follow-up of patients by DSNs remains very individual to centres. Some centres provide much more support than others. Support varies from weekly telephone contact to three daily home visits — one before each meal. The manpower and resources are likely to vary at each centre; these will influence the number of home visits possible. Method, frequency and effectiveness of follow-up require further study.

Medical follow-up was generally very similar between centres, although it did vary from 6 weeks or less to 12 months. The questionnaire suggests that medical follow-up may relate to available DSN support and the level of DSN experience and expertise.

Adjusting insulin

Dose adjustments were mainly made in units rather than percentages This raises the question of whether patients on large insulin doses receive the same benefits as patients on smaller doses. Small unit increases may also be ineffective in ethnic minority groups with type 2 diabetes and marked insulin resistance.

There were few dietitians adjusting insulin. The remainder may need to be encouraged. It is difficult to imagine insulin been adjusted without consideration of food intake and exercise. If dietitians are advising changes in insulin, then with training and support by DSNs, many could adjust insulin. In the future, the role of the clinical diabetes educator (CDE) may be developed. This role is already established in America with CDEs coming from both nursing and dietetic backgrounds (AADE, 1999).

The small number of nurses working from a set protocol for adjustment of insulin was surprising, as nurses at present cannot prescribe insulin. The Crown Report (1999) has supplied guidelines for the use of protocols. The Royal College of Nursing (1991) has also published guidelines on insulin dose alteration by DSNs.

Education

There were discrepancies among the patient education materials supplied by the DSNs at different diabetes centres. There were differences in normal blood glucose levels, sick rules (the appropriate blood glucose level for ketones) and injection techniques (injecting air into bottles). Conflicting information can be a great source of confusion for patients, and it is important that health professionals give consistent information and advice.

Conclusion

The study has shown considerable variation in practice in the UK. It has suggested a need for further research into: the most cost-effective time and place to start insulin; the effective dose and types of insulin; the outcomes of different frequencies of follow-up visits; and the dose adjustment to make.

There is no clear evidence about the most suitable insulin for people with type 2 diabetes who require insulin therapy. Practices can vary across the UK, seemingly at the whim of the diabetologist and the multidisciplinary team. This study has highlighted inequalities in many aspects of care, from patient follow-up to patient information. Some patients are given much more support than others. The benefit, or not, of this extra support is an issue to be addressed by future research. We feel that it is essential to provide equity of access to care throughout the UK for all patients who are commencing insulin therapy. ■

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