

Survey reveals shortfall in paediatric nurses' knowledge of diabetes

Emma Thomas

Introduction

Shortfalls in the knowledge of diabetes care among medical personnel have long been recognized (Etzwiler, 1967). This study set out to ascertain whether paediatric ward nurses' knowledge of diabetes is up to date and whether perceptions of their knowledge and confidence matched actual knowledge. It also sought to determine whether nurses based at a specialist children's hospital had better knowledge than those working in a district general hospital. Results highlighted a shortfall in paediatric ward-based nurses' knowledge of diabetes. An educational programme targeting the knowledge deficits identified in this study is now under way. The study will be repeated after a year to assess whether knowledge has improved.

There can be few medical diagnoses that have such a potentially devastating acute and long-term effect on a child and family as insulin-dependent diabetes mellitus' (Jefferson and Kibirige, 1997). The incidence of childhood diabetes has grown steadily over the past few years, and it is now the most common metabolic disorder of childhood (Boland and Grey, 2000).

The author works as a paediatric diabetes specialist nurse (DSN) in a team that serves a caseload of 350 children with diabetes within a specialist paediatric hospital, and 50 children with diabetes at a district general hospital (DGH). The hospital-based community service provides home support and education for families who have a child with diabetes.

The aim of the paediatric diabetes team is to facilitate home management at the time of diagnosis, and to maintain the health and wellbeing of the child with diabetes within the community setting. Inevitably, however, some hospital admissions will take place. Admissions usually occur at the time of initial diagnosis, surgery or during intercurrent illness, especially when early specialist advice is not sought.

Unpublished figures for children with diabetes at the district general hospital, for the year April 1999 to April 2000, revealed a mean of 1.3 inpatient bed days at diagnosis, and seven children who had had

diabetes for some time spent a mean of 14 days in hospital during that year. There are no national figures available for the numbers of children with diabetes who are admitted to hospital wards.

Education is the cornerstone of diabetes self-management and an essential component of modern diabetes care (British Diabetic Association, 1987; Dunn, 1990; Fain et al, 1999). It is also agreed that effective education improves self-management skills and increases patient satisfaction (Brown, 1988; Mensing et al, 2000). Wamae and Da Costa (1999) identified ward nurses' lack of knowledge of insulin usage as having a negative effect on inpatient diabetes care.

Children with diabetes will, on occasion, turn up as inpatients on hospital wards, providing the opportunity for ongoing education. Ward nurses' diabetes knowledge therefore needs to be up to date to ensure that education regarding diabetes management can continue during their hospital stay or, at the very least, that the care they receive in hospital does not cause them harm or detriment.

Whether ward nurses' poor knowledge of diabetes is a result of deskilling by specialist nurse care, as Castledine (2000) suggests, or due to the fact that only small numbers of children with diabetes are admitted to hospital is unclear. What is clear, however, is that it is essential for

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1 It is essential that ward-based paediatric nurses have a good knowledge of diabetes mellitus in order to provide high-quality care to children with diabetes.

2 Many researchers have identified a shortfall in diabetes knowledge among nurses. This study sought to determine whether this also applied to paediatric nurses.

3 Very few studies have specifically surveyed paediatric nurses.

4 This survey compared knowledge of diabetes mellitus and confidence among ward-based paediatric nurses in a specialist children's hospital and a district general hospital.

5 Safe and consistent care for children can only be provided by confident and knowledgeable nurses.

KEY WORDS

- Diabetes knowledge
- Paediatric nurses
- Nurse education
- Survey

Emma Thomas is a Clinical Nurse Specialist Paediatric Diabetes and Diabetes Home Care Coordinator, Diabetes Home Care, Birmingham Childrens Hospital

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1 Early work highlights a shortfall in diabetes knowledge among registered nurses.

2 It is the duty of specialist nurses to stop ward nurses from becoming deskilled.

3 Many researchers have used a three-questionnaire model to determine demographics, confidence (DRST) and knowledge (DBKT).

4 It is essential to provide evidence of a deficit in diabetes knowledge in order to secure support for training initiatives.

nurses to have a sound and current knowledge base.

Currently, within the author's area of practice there is resistance to the formal provision of training regarding diabetes care and management. This is not a new phenomenon: Heath (1980) discusses the difficulties in convincing nursing managers that staff development is of vital importance. Heller (1998) agrees, and comments that:

'We still have a considerable amount of work to do in, first, persuading our colleagues that they need to know more about diabetes and, second, obtaining resources to deliver the necessary training.'

The rationale is that ward nurses' knowledge is adequate, and therefore training revenue is not being made available and the release of ward nurses to attend a training programme is not a priority. Nurses themselves have shown some resistance to training. MacArthur (1998) highlights the difficulties faced by non-specialist nurses: finding the time, funding and motivation to undertake traditional courses in diabetes may be difficult in areas where it is not seen as a priority. Castledine (2000) believes that it is the duty of specialist nurses to try to prevent staff becoming de-skilled.

Nurses working in diabetes should be well educated and actively involved in developing and delivering educational programmes (Crowley, 2000). However, when examining ward nurses' knowledge of diabetes, it is important to take into consideration three vital aspects of individual nurses:

- Their length and type of experience
- Their level of diabetes education
- Their exposure to people with diabetes.

Literature review

As early as 1967, Etwiler highlighted a shortfall in the knowledge of diabetes care among medical personnel. This study compared the diabetes knowledge of student nurses, dietitians and physicians. Etwiler (1967) used a survey method and assessed knowledge using a questionnaire.

Other researchers have not used Etwiler's questionnaire in their studies

because they found it to be out of date. However, later studies are based on Etwiler's (1967) work.

Scheiderich et al (1983) devised their own 34-question diabetes knowledge questionnaire, and used it to survey 137 registered nurses. They recognised that Etwiler's (1967) questionnaire was out of date and that items of current importance needed to be included, and so took advice from the American Diabetes Association when devising their questionnaire, which is known as the Diabetes Knowledge Test (DKT). Scheiderich et al (1983) acknowledge the work of Etwiler (1967), but highlight its shortcomings in using only student nurses. Later studies therefore assessed the knowledge of other groups of health professionals.

A study by Dolan et al (1987) not only assessed diabetes knowledge, but also highlighted an improvement in knowledge scores post-diabetes teaching. Similar studies were carried out by Burden and Burden (1993) and Graham et al (1998), in which knowledge scores were compared pre- and post-diabetes teaching. They too found improved knowledge scores post-diabetes education.

Moriarty and Stephens (1990), Gossain et al (1993), Jayne and Rankin (1993), Logsdon and Banks (1994) and Baxley et al (1997) have performed some of the more recent work in this area of practice in the USA. Nugent and Kinsman (2003) compared diabetes knowledge levels in surgical and medical nurses in Australia and the UK, and Findlow and McDowell (2002) examined registered nurses' knowledge of diabetes.

However, without exception, the original work, cited by all these researchers, is Drass et al (1989), also an American-based team. Drass et al used a survey design method, involving three questionnaires:

- A demographics questionnaire, assessing length of nursing experience, level of diabetes education, and extent of exposure to diabetes patients
- The Diabetes Self-Report Test (DSRT)
- The Diabetes Basic Knowledge Test (DBKT), a 45-item multiple-choice questionnaire adapted from the DKT of Scheiderich et al (1983).

Correct response	% of nurses giving correct response
Type 1 diabetes is failure of the pancreas to make insulin	88.5%
Blood glucose level should be 4–7mmol/l if no diabetes	93.3%
Insulin allows glucose to move from the bloodstream to the cells	44.6%
Diabetic ketoacidosis is a result of hyperglycaemia and ketones	57.8%
Hypoglycaemia is defined as blood glucose concentration <4 mmol/L	53.0%
Lipohypertrophy would result following repeated injections into the same site	27.1%
Intermediate-acting insulin lasts 8–10 hours in the system	35.8%
A 'one-off' high blood glucose level should result in the urine being checked for ketones	68.7%
If a mealtime dose of insulin is missed on a basal bolus regimen, the dose should still be given under the direction of medical staff	50.0%
The symptoms of hyperglycaemia are polydipsia and polyuria	40.4%
Children should be monitoring blood glucose daily before a different meal each day	56.0%
A child with diabetes undergoing endoscopy should withhold insulin until after the procedure is completed	24.8%
During illness, more insulin would be required	45.5%
Children with diabetes should eat carbohydrate foods regularly in sufficient amounts to satisfy their appetites	42.2%
A diet for diabetes should be rich in complex carbohydrates	23.5%
Insulin that a child is using every day at home should be stored in a cool dry place	26.5%
Evening insulin is best injected into a leg injection site to allow slower absorption	32.5%
Insulin should be injected subcutaneously	88.0%
Anyone with diabetes (type 1 or 2) should be tested for ketones during hyperglycaemic episodes	20.6%
A hypoglycaemic episode before insulin is due should be treated with glucose, and the insulin given as prescribed, followed up by the meal	30.7%
The appropriate treatment of hypoglycaemia is glucose repeated until symptoms have subsided, and then food	49.7%
Human insulin should be given before meals	84.2%

Figure 1. Correct responses to the multiple-choice knowledge (DBKT) questionnaire and percentage of nurses identifying them correctly.

Research design and methods

An exploratory survey design was used to carry out this research, as in many of the studies cited earlier. The main rationale for using this method was that, as explained by Cormack (1996), it is useful when the researcher wishes to make statements about a sample population without actually surveying an entire population, i.e. 'a population census'.

As stated earlier, many other researchers have replicated the DBKT questionnaire.

Sample

The sample comprised 150 qualified nurses working on five ward areas within an inner-city children's hospital, and 53 qualified nurses working on three paediatric wards of a local DGH.

Of the total sample, 95.4% had a children's nursing qualification: 59.2% of these were child branch (Project 2000) and 40.8% were registered sick children's nurses (RSCNs).

Questionnaires

The three questionnaires were piloted before the study. The demographics questionnaire and the perceived knowledge and confidence questionnaire, similar to the DSRT questionnaire of Drass et al (1989), did not require adaptation following the pilot study; the knowledge questionnaire, adapted from the DBKT questionnaire, required some modification to avoid ambiguity of answers. The perceived knowledge and confidence questionnaire (DSRT) and the knowledge questionnaire (DBKT) were multiple-choice questionnaires.

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1 A modified version of the Dass et al (1989) questionnaires was used in this survey.

2 The questionnaires were piloted and adapted before the study to ensure validity and reliability.

3 Of the 203 nurses identified as eligible for the study and sent questionnaires, 174 completed all three questionnaires, giving a response rate of 84%.

The demographics and DSRT questionnaires were delivered to participants at the beginning of a shift. It was estimated that participants would take only 5 minutes to complete both of these. Once the completed questionnaires had been collected, the DBKT questionnaire was given to participants, who were instructed not to use text or reference books. It was estimated that it would take 10–20 minutes for them to complete this 22-point questionnaire. The completed DBKT questionnaires were either collected by the research nurse or posted to her.

Of the 203 study participants given questionnaires, 174 returned all three questionnaires and these were included in the data analysis. The total response rate of 86% was made up of 127 nurses (84%) from the children's hospital and 47 nurses (88%) from the DGH. This response rate is significantly higher than in other studies, and is attributed to the research nurse working solely on this project.

Before the start of the study the research nurse identified the nurses who were eligible for inclusion in the study, and attended the ward when they were on duty.

Knowledge questionnaire results

The results were analysed using SPSS. Random data entries were checked manually to ensure accuracy.

The priority was to determine the knowledge scores of the nurse participants. Only 8 of the 22 multiple-choice questions were answered correctly by $\geq 50\%$ of the nurses (shown in bold in *Figure 1*). These results were highlighted to allow comparison of data when the survey is repeated following completion of the educational programme.

A significantly high proportion (88.5%) of respondents were able to state correctly that type I diabetes is caused by failure of the pancreas to make insulin. However, the researcher is mindful that the lack of basic nursing knowledge in 11.5% of respondents is unacceptable in a cohort of qualified paediatric nurses.

Insulin is life sustaining for children with type I diabetes. A staggering 54.5% of respondents did not know that insulin allows glucose to move from the bloodstream to

the cells. Among these incorrect responders, there was confusion about whether its function was to digest glucose, to move glucose from the cells to the bloodstream or to allow glucose to pass into the urine. On a practical level, 72.9% were unable to correctly identify that repeated injections of insulin into the same site may cause lipohypertrophy.

All wards surveyed, whether at the children's hospital or the DGH, have protocols in place governing the management of surgery for children with diabetes. It was therefore worrying to discover that only 24.8% of the nurses were able to correctly identify the procedure for minor surgery. Approximately 60% of nurses who answered incorrectly would have admitted the child the night before and administered intravenous glucose and insulin. The protocol in place clearly states that for minor surgery a child should be admitted as a day case. They would be first on a morning list and both insulin and breakfast would be omitted.

More than half the nurses (57.8%) were unaware of the need for children with diabetes to eat regularly, and only 23.5% knew that their diet should be rich in complex carbohydrates. This is particularly worrying as, in the absence of parents, paediatric ward nurses are responsible for advising children with diabetes on what to eat. A worrying 10.2% of the nurses thought that children with diabetes should eat whatever and whenever they liked.

ANOVA was used to compare mean diabetes knowledge scores according to years of nursing experience, level of education, diabetes education, or a history of diabetes in self, family or friends.

The majority of respondents had limited personal experience of diabetes (no personal experience 74.7%; family 19.5%; friend 5.8%; self 0%), therefore no relationship between this parameter and knowledge scores could be determined.

The number of respondents who had received either no training in diabetes or had been trained many years ago (*Figure 2*) was so high that a correlation between knowledge scores and impact of diabetes training could not be made. Other studies (e.g. Burden and Burden, 1993) have found a positive correlation between higher

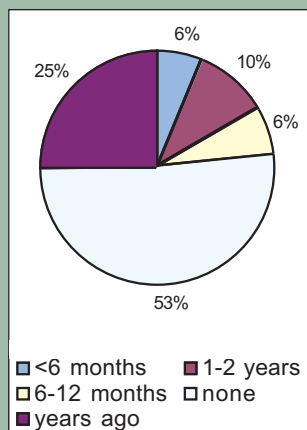


Figure 2. Extent of respondents' training in diabetes care.

knowledge scores and more recent diabetes training.

The results can be summarised as follows:

- There was no significant difference between the knowledge scores of those working at the children's hospital and those working at the DGH.
- When a nurse had received training had no significant impact on knowledge scores.
- RSCN and child branch (P2000) nurses had comparable knowledge scores.
- Nurses working on wards where one or more children with diabetes are nursed per month scored better than those who worked on wards where children with diabetes were admitted less frequently.
- Perceived knowledge and confidence (DSRT) scores correlated with knowledge (DBKT) scores, i.e. those with poor confidence and perceived knowledge had lower knowledge scores (Figure 3).

Implications and indications for future research

An educational programme targeting the knowledge deficits highlighted in this study is now underway. During almost 12 months of running this programme, only 65 of the 203 eligible nurses have attended and completed the course. It is hoped that, following seminars to nurses and their managers highlighting the shortfalls in knowledge identified in this study, many more will access the training.

A subsequent study using the same DSRT and DBKT questionnaires will be commenced during the next 6 months, following completion of the educational programme by more nurses.

Conclusion

This study clearly highlights a shortfall in diabetes knowledge among ward-based paediatric nurses. In this they are no different from their adult nursing colleagues, as shown by many of the studies cited in this article. However, the increasing incidence of type I diabetes during childhood makes it crucial for paediatric ward-based nurses to have a sound diabetes knowledge base.

Provision of educational programmes, and ready access to them, are essential, and

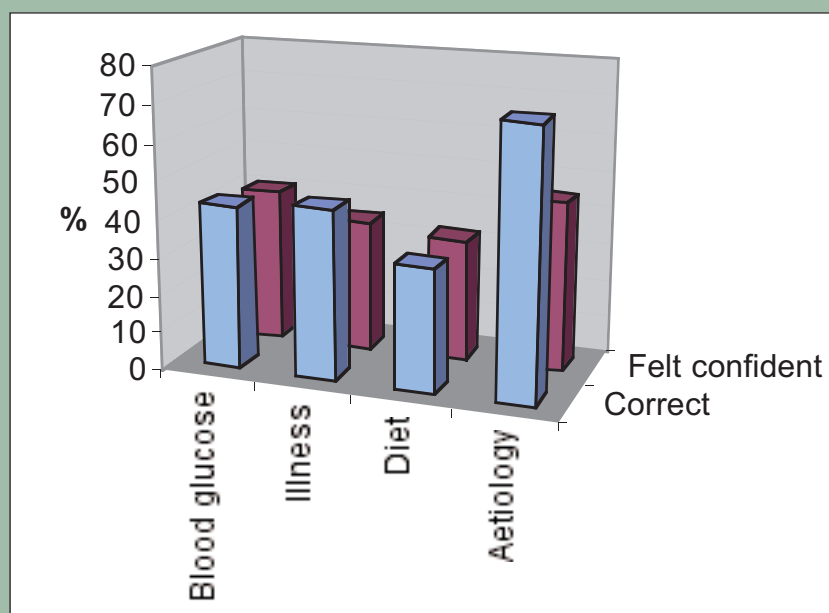


Figure 3. Correlation between confidence and knowledge scores among respondents.

a measure of their effectiveness is an important consideration for the future. It is not sufficient merely to highlight a shortfall in knowledge – paediatric DSNs also have a duty to develop training and support networks to prevent their ward-based colleagues becoming de-skilled. ■

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