

# Managing hypoglycaemia in hospital

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## Article points

1. The management of hypoglycaemia is often haphazard with resources disorganised and difficult to access.
2. An approach involving three specialist groups has proven effective in improving hypoglycaemia management of in hospital and enhancing the patient experience.
3. A strategic framework has been developed at the Oxford Radcliffe Hospitals Trust to improve the management of hypoglycaemia in hospital.

## Key words

- Hypoglycaemia
- Inpatient

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Diabetes in the hospital setting can use large amounts of hospital resources (DoH, 2001). In the Oxford Radcliffe Hospitals Trust, a multidisciplinary group has addressed the issue of how to improve the management of care of people who have a hypoglycaemic episode while in hospital. The resulting approach, discussed in detail here by Helen Baker and colleagues, focusses around education sessions and practical aids.

The management of hypoglycaemia in hospitals is often haphazard, with resources disorganised and difficult to access (Furness et al, 2006). Nurse and doctor knowledge is variable and the principal fear expressed by the person with diabetes is of hypoglycaemia (Williams and Pickup, 2004). The risk of hypoglycaemia increases when in hospital due to interruption of normal life: procedures requiring nil-by-mouth, changes in nutrition due to intercurrent illness, delayed meals and inappropriate timings of therapies.

Hypoglycaemia can also be the primary cause for admission and is associated with inter-current illness, such as impaired renal function (American Diabetes Association, 2005), leading to protracted episodes requiring intensive treatment.

Early signs of hypoglycaemia – for example, sweating, pallor, dizziness and palpitations – may be confused with other acute illnesses. This confusion can delay diagnosis and treatment, which is pertinent to the acute inpatient setting and is a contributory factor to delayed discharge from hospital.

People with diabetes are admitted to hospital

twice as often and stay twice as long as those without the condition and occupy one in ten acute hospital beds. Approximately 10% of hospital inpatient resources are used to care for people with diabetes, who frequently report a poor inpatient experience (DoH, 2001). Lack of healthcare professional knowledge, inappropriate timings of food and therapy, and a general lack of information are common complaints. A delay in discharge, even when the primary cause for admission is not diabetes, is also common (Audit Commission, 2000; DoH, 2001).

During 2005, 750 people were referred to the Diabetes Inpatient Specialist Team (DIST) at the John Radcliffe Hospital, Oxford, for diabetes care; however it is worth noting that there are many inpatients with diabetes who have the potential for developing hypoglycaemia during their hospital stay who are not referred to the team.

Standard 8 of the National Service Framework for diabetes (DoH, 2001) relates to improving the care of patients while in hospital and recognises the impact of specialist diabetes care in reducing length of stay and enhancing patient experience. Additionally, standard 7 focusses on diabetes

emergencies (including hypoglycaemia) and the need for knowledge and skills in the staff at the front line.

The nurse is pivotal in ensuring appropriate care and takes a significant role in diagnosis, treatment and education. Given the increasing hospital population who have diabetes, it is essential for all healthcare professionals to have the requisite knowledge and skills to effectively recognise and treat hypoglycaemia (DoH, 2001).

To address these issues a strategy to improve the management of hypoglycaemia in hospitals has been developed collaboratively by three specialist groups within the authors' trust: the DIST, the diabetes outpatient team and the Corporate Professional Development Team. The strategic framework subsequently developed includes diabetes education that incorporates a self-directed learning pack, a practical kit for use in wards and departments – the Hypobox – and audit.

### Diabetes education framework

The education aspect of the framework aims to address all aspects of caring for people with diabetes in hospital at all staff levels, through structured education and an informal component to address the specific needs of wards and departments (*Table 1*).

Our aim was to find accessible and resourceful initiatives to help staff develop professionally, as attending full study days devoted to diabetes can be challenging due to competing education and workforce demands.

### Informal education

Informal sessions were tailored to suit each clinical area's needs and involved responding to risk incidents and teaching at convenient times, such as working lunches and in response to on-the-spot requests for help.

### Self-directed learning

A self-directed learning package was designed to raise awareness of hypoglycaemia and to enhance knowledge and skills so that it can be effectively managed and treated. This is to address the concern that nurses may not always fully understand hypoglycaemia and as a result may not manage episodes effectively.

**Table 1. The structured and informal components of diabetes education used to address the specific needs of wards and departments.**

- Hospital nurses diabetes update. (2-day course)
- Diabetes awareness day. (1-day flexible session)
- Diabetes dilemmas.
- Link nurse study day.
- Tailored training.
- Preparing doctors for practice.
- Self-directed learning pack.

**Table 2. Hypobox contents.**

- Dextrose tablets.
- Lucozade.
- Glucagon for injection intramuscularly or subcutaneously.
- 50% dextrose intravenous.
- 50 ml syringe.
- Green butterfly.
- Re-order information:
  - dextrose tablets: DISN 22866.
  - Lucozade: NHS logistics catalogue, page 628 (stores top up).
  - glucagon and dextrose: pharmacy stores.

### Page points

1. Nurses play an important role in recognising and managing hypoglycaemia in the hospital setting.
2. The diabetes education framework developed by the authors incorporates education sessions at convenient times and on-the-job, as well as self-directed learning aids.



*Figure 1. Drawing of Hypobox and its contents.*

nurse network to maintain diabetes care skills and education within wards and departments. It contains a variety of knowledge sections which are complemented by exercises that require the

**Page points**

1. The Hypobox contains an easy-to-follow treatment algorithm and treatments for hypoglycaemia in all levels of consciousness.
2. The authors report that the Hypobox had a positive safety and financial impact on the treatment of semi-unconscious or unconscious people with hypoglycaemia.
3. An audit was conducted to assess the impact of education and new management aids, and in the small population sampled found that nurses who had undergone recent education sessions scored better than those who had not (65.5% versus 45%, respectively).

reader to reflect on their own practice.

The topics include:

- signs and symptoms of mild, moderate, and severe hypoglycaemia
- treatments
- glucagon
- causes of hypoglycaemia
- case study
- educational issues.

**The Hypobox**

The scenario of nurses taking too long to find appropriate treatment a hypoglycaemic episode needed to be addressed. It is common to find resources inadequate, exposed to multiple use and past the expiry date. Thus, the Hypobox was developed as a practical aid for the management of hypoglycaemia. It is a simple concept: a portable kit provided to wards and departments containing all necessary first-line treatments for people who are conscious, unconscious or receiving enteral nutrition teamed with an easy-to-follow treatment algorithm (*Table 2, Figure 1*).

The Hypobox was initially introduced through tailored ward- or department-based sessions alongside the education programme for all healthcare professionals. Evaluation of the kit demonstrated risk-reduction and cost-effective improvements within the trust. Initially, the kit contained boxed dextrose powder as an oral treatment, but this was difficult to measure accurately, needed mixing with fluid, was exposed to multiple use and left the kit covered with a layer of fine white powder after use! Subsequently, this has been replaced with pre-packaged dextrose tablets.

The Hypobox has had a particular impact in the treatment of hypoglycaemia in unconscious or semiconscious people. Oral glucose gel treatment should not be administered in such cases due to aspiration risk. Any confusion that surrounds the administration of a glucose gel in these circumstances thereby increases the risk that it will be administered in inappropriate circumstances. Replacing the oral treatment gel with Lucozade has improved safety in the treatment of unconscious people with diabetes and has the potential to save almost £3.00 per oral treatment (GlucoGel £3.10, Lucozade £0.14).

However, in the authors' experiences, oral glucose gels should still be recommended in people who are conscious, hypoglycaemic and are on limited fluid restriction (where 100ml of additional fluid would be significant).

**Further recommendations**

A poster presentation of the Hypobox is to be used in the near future as the basis for a poster campaign throughout the authors' trust to further promote the safe and effective management of hypoglycaemia in hospital.

Currently the use of dextrose 50% versus dextrose 10–20% is being reviewed. The outcome of this has the potential to reduce extravasations, risk of necrosis and further reduce costs.

**The audit**

The aim of the audit was to:

- Assess staff knowledge of the correct management of hypoglycaemia.
- Identify gaps in knowledge.
- Determine whether diabetes support services improved staff knowledge levels.

Two areas were audited: acute medicine with specialist nurse provision and acute surgery where there was no service provision.

Methods included a brief on-the-spot questionnaire based on trust guidelines (*Table 3*). Additional information gathered covered the attendance at education sessions and an evaluation of the Hypobox in appropriate areas. Fifty-four nurses from acute medicine, 24 nurses from acute surgery and 20 doctors completed the questionnaire. Both doctors and nurses were included in the audit as both play fundamental roles in the recognition and management of hypoglycaemia in hospital. The mean score of nurses working in acute medicine was 65.5% compared to 45% in those working in acute surgery. While the doctors scored higher, averaging 70% correct, there is still scope for improvement. Thus, doctors should continue to be included in targeted education (*Figures 1 and 2*).

Gaps in knowledge were variable. Areas of concern included the low blood glucose levels at which staff chose to start treatment and the prolonged period that staff were prepared to

wait before rechecking blood glucose and the effectiveness of treatment.

The audit results suggested that the DIST did have a beneficial impact on management of hypoglycaemia and that acute surgery was a potential target to expand the service into. This expansion has since been successfully implemented. Plans to re-audit the management of hypoglycaemia are in place as is an audit of the effectiveness of the Hypobox.

### Conclusion

Evidence that a combination of the Hypobox, hypoglycaemia education and service provision by the DIST is effective has been proved by audit of the management of hypoglycaemia at the John Radcliffe Hospital. The Hypobox has provided a focus for improving the safe management of hypoglycaemia and a vehicle to promote education and update healthcare professionals. More information about the occurrence, cause and treatment of hypoglycaemia in hospital is needed to further improve the management, provision of appropriate resources and education.

The collaboration of specialist diabetes services, professional development and innovation has proved successful in its overall aim – to enhance the inpatient experience for those with diabetes and provide safe and effective management of hypoglycaemia. ■

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Table 3. Hypoglycaemia knowledge questionnaire.

Question	Correct answer
At what blood glucose level should you start treatment for a hypoglycaemic event?	<4.0 mmol/l
How would you treat a hypoglycaemic event in a conscious patient?	Glucose gel, oral glucose, or a sugary drink
How would you treat a hypoglycaemic event in an unconscious patient?	Intramuscular glucagon or intravenous 50% dextrose
Where would you find the above treatments together on the ward?	(Location of areas with a Hypobox)
After how long would you re-check blood glucose following treatment for a hypoglycaemic episode?	Within 15 minutes

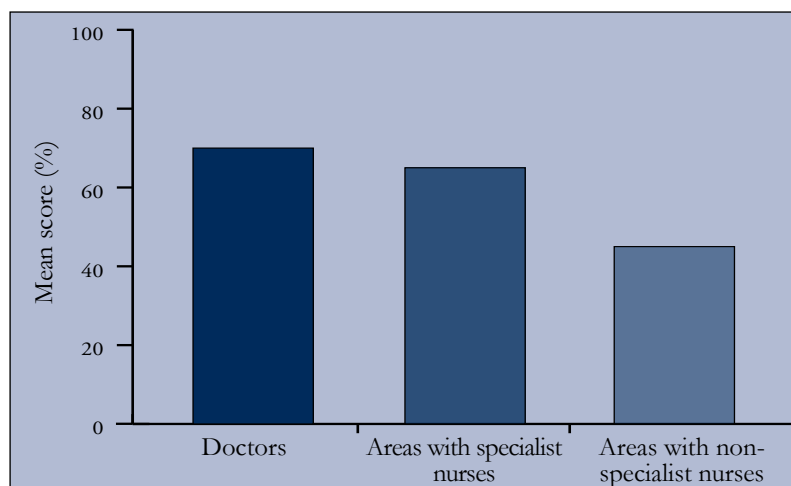


Figure 1. Results of hypoglycaemia knowledge questionnaire by profession.

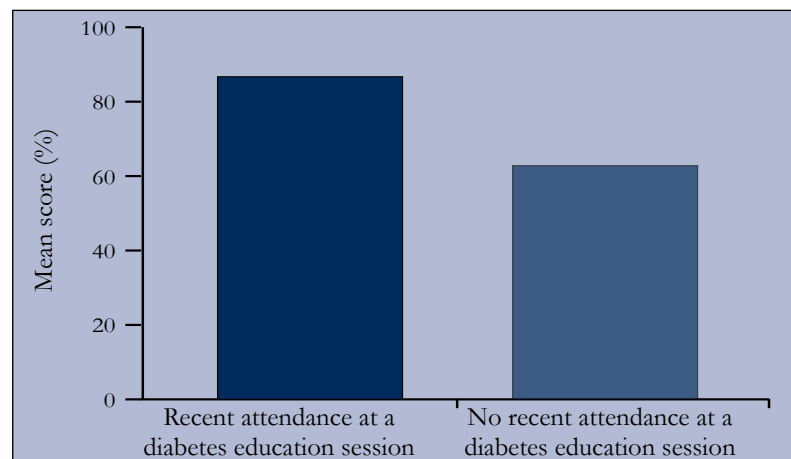


Figure 2. Audit results: Impact of recent education on questionnaire scores.