

Hypoglycaemia prevalence in care homes: An audit

Fiona Kirkland, Joy Robertson,
Margaret Clowes

A significant proportion of people living in care homes have diabetes, the management of which may be complicated by other long-term conditions. Episodes of hypoglycaemia often go unnoticed by under-trained staff and so are not treated appropriately, impacting on the overall wellbeing of the individual. An audit of care homes in South Staffordshire PCT was carried out to establish the rate of hypoglycaemia and the resources available to treat it. This article describes the results of the audit and the measures taken to improve the care of this vulnerable population.

A large number of people residing in care homes have diabetes (for the purposes of this article both residential and nursing homes are considered as care homes). These residents are vulnerable because they often have more than one long-term condition. They may also develop diabetes complications, including retinopathy, kidney disease and diabetic foot disease, and having more than one health demand makes any one of the conditions more difficult to manage.

Older people living in care homes are often not able to fully care for themselves and rely on the knowledge and skills of the nurses and healthcare assistants (HCAs) for their diabetes management. The care-home staff, however, may be uninformed – they are unaware of what they do not know – and believe that they are delivering high-quality care.

The recently published clinical practice guidelines from Diabetes UK (2010a) aim to increase interest in this area of care of some of the most vulnerable people with diabetes.

The guidelines recommends that an optimum level of metabolic control be achieved to avoid hyperglycaemia and “substantially reduce the risk of hypoglycaemia in those residents taking sulphonylurea or insulin”.

In South Staffordshire, the care-home DSNs (CHDSNs) delivering general diabetes education became aware that hypoglycaemia is a bigger issue than was initially identified and that episodes are often not recognised.

To address this, an educational strategy was launched to improve the identification, management and prevention of hypoglycaemia in care homes. Rates of hypoglycaemia were identified and one of the areas of hypoglycaemia management was considered in further depth for the purpose of this article.

Diabetes and hypoglycaemia in South Staffordshire care homes

The number of people with diabetes in South Staffordshire PCT (SSPCT) was 26 000 (4.8%) in April 2010, of which 12 877 (49.8%) were over the age of 65 years. The proportion

Article points

1. An educational strategy was launched to improve the identification, management and prevention of hypoglycaemia in care homes.
2. The care home DSNs implemented an educational approach including the introduction of hypoboxes.
3. The results of this audit of hypoglycaemia prevalence suggests that people living in care homes taking sulphonylureas or insulin therapy with an HbA_{1c} level of <6.5% (<48 mmol/mol) should be carefully monitored, as it is very likely that they are experiencing episodes of either acute or chronic hypoglycaemia.

Key words

- Audit
- Care homes
- Hypoglycaemia
- Older people

Fiona Kirkland is Nurse Consultant for Diabetes, Joy Robertson, is a Care Home DSN, Margaret Clowes is a Care Home DSN at South Staffordshire Primary Care Trust.

Page points

1. South Staffordshire PCT has around 4300 care-home beds that offer nursing, residential and learning difficulties care. Based on national data, the authors speculate that a minimum of around 25% of these beds are occupied by people with diabetes.
2. Hypoglycaemia in care homes is under-recognised both by the person with diabetes and by the healthcare professional.
3. Chronic hypoglycaemia is strongly suggested by an HbA_{1c} level as low as 4.8% (29 mmol/mol) while that person is still treated with a sulphonylurea or insulin therapy. If blood glucose levels were to be measured regularly many would be found to be ≤ 4 mmol/L.

of people with diabetes over the age of 65 years was surprising, although similar figures have been presented elsewhere (Diabetes UK, 2010b). Recent data have shown that around 20% of the general population over the age of 65 years has diabetes (Diabetes UK, 2010b).

SSPCT has around 4300 care-home beds that offer nursing, residential and learning difficulties care. Based on national data, the authors speculate that a minimum of around 25% of these beds are occupied by people with diabetes (Sinclair et al, 2001; Diabetes UK, 2010a). Therefore, SSPCT has around 1100 people with diabetes residing in a care home.

As nurses keen to improve the quality of diabetes care being delivered in care homes, the CHDSNs led and implemented the delivery of an educational model to increase the knowledge and skills of those delivering care in care homes (including HCAs and nurses). The review of HbA_{1c} results and diabetes medications being taken by those residing in care homes confirmed the existence of unidentified hypoglycaemia.

Hypoglycaemia in care homes is under-recognised both by the person with diabetes and by the healthcare professional. Identifying hypoglycaemia can be even more difficult in some older people where communication and recognition of symptoms are barriers. Where symptoms are present, they may be misinterpreted as a result of deteriorating health, which may result in an inappropriate adjustment in other medications.

Traditionally, in the authors' experience, people with diabetes were not told about hypoglycaemia when they were started on a sulphonylurea therapy, so a valuable educational opportunity was missed. Therefore, when asked if they have "hypos" they often say "no" due to a lack of understanding of the symptoms. Thus, measuring the acknowledged rates of hypoglycaemia in care-home residents is very difficult.

In general practice, high HbA_{1c} levels are noted and action is taken. If the result falls below the pre-agreed target, this may not be noticed; it is considered a result of good diabetes management and so is not generally followed-up. However, the unrecognised hypoglycaemia

may be having disabling consequences for the older person.

Hypoglycaemia in older people can be acute or chronic. The latter is strongly suggested by an HbA_{1c} level as low as 4.8% (29 mmol/mol) while that person is still treated with a sulphonylurea or insulin therapy. If blood glucose levels were to be measured regularly many would be found to be ≤ 4 mmol/L – yet measurements are rarely carried out. Chronic hypoglycaemia reduces the ability of a person to carry out the activities of daily living such as continence, washing, dressing and eating.

On occasions, blood glucose levels and HbA_{1c} levels may appear to be higher than expected due to "rebound hypoglycaemia". This can result in a disastrous increase in medication by well-meaning practitioners who, in error, feel that blood glucose levels are too high when the opposite is true and the low blood glucose levels are rebounding following gluconeogenesis, or becoming erratic after meals containing carbohydrate, which in the case of a care-home resident are often very close together and can lead to gorging.

Hypoglycaemia audit

To address the issue of acute and chronic hypoglycaemia, it was important to first identify the size of the problem, and second, develop a strategy to begin to address it.

Methods

Data collection for rates of hypoglycaemia was carried out. A total of 28 care homes with a combined population of 476 people were identified. Residents with either type 1 and type 2 diabetes, treated with metformin, a sulphonylurea, insulin or no medication were included ($n=105$).

After gaining informed consent from the residents with diabetes, their blood glucose levels were measured four times daily before meals to identify hypoglycaemia. Each resident was provided with their own blood glucose monitoring meter and whenever possible they tested their own blood glucose level, following an agreed protocol with support. When this was

not possible, a trained HCA completed the test and documented it.

Finger-prick blood testing was carried out in this way for a 5-day period. A standard blood glucose meter was used and was calibrated according to the manufacturer's instructions.

Care-home staff were informed that the person may be asymptomatic of hypoglycaemia, however they were still considered hypoglycaemic. An episode of hypoglycaemia was defined as a blood glucose level of <4 mmol/L and the results were not backed up by laboratory testing.

Results

Table 1 provides a summary of the number of recorded episodes of hypoglycaemia. A total of 27 people out of the 50 from the sulphonylurea and insulin groups combined had between one and eight recorded episodes of hypoglycaemia. Of these:

- Six people had one episode.
- Four people had two episodes.
- Five people had three episodes.
- Three people had four episodes.
- Six people had five episodes.
- Two people had six episodes.
- One person had eight episodes.

All of the residents with an HbA_{1c} level of <6.5% (<48 mmol/mol) treated with a sulphonylurea or insulin had experienced a hypoglycaemic episode.

Eight people appeared to have experienced a period of chronic hypoglycaemia where their blood glucose levels were <4.0 mmol/L for three or more consecutive blood tests.

Discussion

Potential causes of hypoglycaemia were investigated and included:

- A lack of understanding among care-home staff regarding the profiles of medications and their timing in relation to food.
- Frequent interruptions on large drug rounds resulting in stopping and starting up to five times in one round.
- Mealtimes being very close together with a long overnight fast of around 14 hours in most care homes.

- Care driven by Quality and Outcomes Framework (QOF) targets and the assumption that with the achievement of such targets, care has improved.

- A lack of an expert resource (for example, a CHDSN) so staff continued to be ignorant about their failure to deliver high-quality diabetes care.

- Task orientation of care in the care home due to workforce pressures.

- Individual weight loss but no medication review or proportional reduction in medication.

- No easy access to hypoglycaemia correction tools if an episode of hypoglycaemia was detected.

A number of strategies were implemented as a result of the audit:

- Training HCAs to deliver insulin at the right time for the individual so that it matched mealtimes.

- Additional training of staff regarding hypoglycaemia, the mode of action of various medications and whether or not they need to be taken with food.

- The building of a "hypobox" and encouraging maintenance and correct use in each care home.

- Improved availability of the CHDSN as an expert resource.

Treatment of recognised hypoglycaemia

Once hypoglycaemia was identified it was discovered that there was often no access to hypoglycaemia treatment. The CHDSNs implemented an educational approach including the introduction of hypoboxes.

Page points

1. All of the residents with an HbA_{1c} level of <6.5% (<48 mmol/mol) treated with a sulphonylurea or insulin had experienced a hypoglycaemic episode.
2. Potential causes of hypoglycaemia were investigated and included a lack of understanding among care home staff regarding the profiles of medications and their timing in relation to food.
3. Once hypoglycaemia was identified it was discovered that there was often no access to hypoglycaemia treatment. The care-home DSNs implemented an educational approach including the introduction of hypoboxes.

Table 1. Episodes of hypoglycaemia by treatment type.

Treatment	Number of recorded episodes of hypoglycaemia	Number of people with an HbA _{1c} level <6.5% (<48 mmol/mol)
Insulin (n=22)	14	7
Sulphonylurea (n=28)	13	12
Metformin alone (n=13)	0	4
No medication (n=42)	0	12

Page points

1. The use of the hypobox was audited 1 year after its introduction. Prior to the introduction of hypoboxes and education in care homes, none of the homes had ease of access to hypoglycaemia management treatments.
2. The hypobox audit results show a great improvement in the knowledge of hypoglycaemic episodes and the availability of treatment.
3. This audit suggests that people living in care homes taking sulphonylureas or insulin therapy with an HbA_{1c} level <6.5% (<48 mmol/mol) should be carefully monitored, as it is very likely that they are experiencing episodes of either acute or chronic hypoglycaemia.

Hypoboxes are plastic boxes containing:

- Hypoglycaemia management instructions.
- Dextrose tablets.
- Lucozade.
- A carton containing natural orange juice.
- Contact times and details of the CHDSN.

An educational session was delivered in each care home to introduce the hypoboxes and raise awareness on the recognition, prevention and management of hypoglycaemia.

To encourage ownership, a named HCA was made accountable for the upkeep of the hypobox.

Results of the hypobox audit

The use of the hypobox was audited 1 year after its introduction. Prior to the introduction of hypoboxes and education in care homes, none of the homes had ease of access to hypoglycaemia management treatments.

The results of the audit helped to identify the areas of improvement required.

The care homes were visited and a simple questionnaire was completed by the home:

- Is the hypobox accessible?
Yes, 81%; No, 19%.
- Is the hypobox fully equipped?
Yes, 65%; No, 35%.
- Are the contents in date?
Yes, 69%; No, 31%.
- On questioning, can the staff treat a hypo?
Yes, 85%; No, 15%.

The results were not as positive as the CHDSNs desired. However, they do show an improvement in the knowledge of hypoglycaemic episodes and the availability of treatment. Further educational input and reinforcement is required and the aim now is to introduce education into the existing inspection process.

Discussion

This article looks at one aspect of managing hypoglycaemic episodes through education and hypoboxes. Many other aspects have also been identified and addressed locally, such as the timing of medication with mealtimes, delivery of insulin by HCAs following training and measurement of competencies. Gap analysis

may determine other areas of management that need addressing in other locations.

Ongoing input is essential to improve the quality of care being delivered to a large proportion of the population with diabetes. HCAs with a higher level of diabetes management skills tend to move between care homes, offering a natural cascade of knowledge. However, continued education and the presence of easy access to an expert specialist resource is key. Flexibility and adaptability are essential to determine and meet needs; staff do not always accept support from the CHDSN because they may feel it is an inspection; therefore, a high level of communication and reassurance is required.

Local diabetes networks and diabetes strategies (Department of Health, 2005) will clearly identify the need for resources for care homes that will need to be met through either resource reallocation or new finances. Cost savings have been made in the locality by “spend to save” on reducing admissions to hospital. Money needs to be spent earlier in the progression of the condition to improve care and optimise medications, to prevent complications and hospitalisations later.

Conclusion

The education delivered by CHDSNs increased the awareness of hypoglycaemia among care-home staff, but it then became clear that hypoglycaemia management tools were not available. Even with the introduction of hypoboxes, which did improve access to treatment, not all care homes were able to maintain the boxes.

This audit suggests that people living in care homes taking sulphonylureas or insulin therapy with an HbA_{1c} level <6.5% (<48 mmol/mol) should be carefully monitored, as it is very likely that they are experiencing episodes of either acute or chronic hypoglycaemia. It is important that such people are “flagged” for follow-up on general practice computer systems and by other means. A number of reasons have been identified and indicate the need for a multifaceted approach to reduce episodes of hypoglycaemia in care homes. ■

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