Type 2 diabetes and hypertension in older adults: a case study


Summary
The management of long-term conditions in the older adult population can be challenging and complex. After examining the literature and exploring some common issues, this article uses a reflective case study to demonstrate key findings in the management of hypertension and diabetes in an older adult that can be used to support effective interventions and positive outcomes.

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Keywords
Ageing, diabetes, hypertension, long-term conditions

This article explores the management of type 2 diabetes and hypertension in adults aged over 65. A case study is used to illustrate the complexity of, and frequent challenges in, prescribing for the older adult population. Common themes relating to the management of long-term conditions are identified, with the aim of reducing unnecessary and inappropriate hospital admissions. Nursing management of such conditions is discussed within the context of current guidelines.

The NHS Improvement Plan (Department of Health (DH) 2004) introduced the role of the community matron. These experienced, skilled nurses use a case management approach to identify patients with complex long-term conditions. Evidence shows that high-quality personalised case management can ‘improve patients’ lives dramatically, reduce emergency admissions to hospital and enable patients to return home from hospital more quickly when they do have to be admitted’ (DH 2004).

Hypertension in older adults
Cardiovascular disease is a common cause of mortality in the UK, accounting for almost 200,000 deaths each year. Around one in five men and one in seven women die as a result of cardiovascular disease every year (Allender et al 2008). Hypertension is estimated to affect more than 50% of people over the age of 65 and is a known risk factor for stroke and cardiovascular disease (Nicholls and Sani 2003/2004). Stroke and coronary heart disease are major causes of death among over 65s in the UK (Williams et al 2004).

When considering pharmacological interventions for hypertension, it is important to understand what the ‘normal’ blood pressure values are and how age may affect these values (Table 1). Vascular resistance is known to increase with age, rising approximately 1% annually from the age of 40 years. A difference of 10% is usually considered significant in hypertension management (Woodrow 2004).

Measuring blood pressure provides an easy and effective way to assess and monitor cardiovascular health (Woodrow 2004), along with other lifestyle interventions factors such as weight, body mass index (BMI), lipid profile and physical activity (National Collaborating Centre for Chronic Conditions 2006).

Older people have been neglected in terms of hypertension assessment and management, possibly because evidence that the benefit of treating people over the age of 80 years is...
inconclusive (Beckett et al. 2008). One study suggests that older people are often excluded from clinical research studies because of the fear that frailty and co-morbid conditions may put them at increased risk as a result of the study’s intervention (Bugeja et al. 1997).

Treatment that lowers blood pressure has been found to reduce the risk of cardiovascular complications in the older adult population (Pountney 2007). It has been asserted that adults over the age of 80 years should be offered the same treatment for hypertension as younger people, and that older people receive worthwhile benefits from treatment, particularly in terms of reduced risk of stroke (Beckett et al. 2008).

While hypertension is often managed by pharmacological interventions, it is vital that patients are offered lifestyle advice. This should include maintenance of an ideal BMI (20-25); a diet that is rich in fruit and vegetables, includes a selection of low fat dairy produce and the consumption of less than 6g sodium daily; and physical aerobic activity, for example a brisk daily walk lasting 30 minutes, if able (Williams et al. 2004). People who smoke should be given advice and support to stop. Lifestyle advice should be offered initially and then reinforced periodically. Blood pressure should be measured monthly or more frequently if the patient is severely hypertensive (National Collaborating Centre for Chronic Conditions 2006).

Measuring blood pressure
Most nurses feel competent in measuring blood pressure but, according to NICCE guidance, they should have their performance reviewed periodically. The National Collaborating Centre for Chronic Conditions (2006) recommends the following considerations when taking blood pressure readings:

- Standardise the environment. The room should be quiet, warm and relaxed. The patient should be seated with his or her arm outstretched and supported.
- Take a second confirmatory reading at the end of the consultation if the first exceeds 140/90 mmHg.
- Measure blood pressure on both arms and use the arm with the higher reading as reference for future readings.
- If the patient has symptoms of postural hypotension (falls/dizziness), measure standing blood pressure.
- To ensure hypertension (persistent raised blood pressure 140/90 mmHg) is identified correctly, check blood pressure twice on at least two further occasions.
- Take measurements at monthly intervals, or more frequently if the patient has severe hypertension.

Studies have shown benefits in treating older adults for hypertension, and many drugs are available. For example, low-dose thiazides and calcium channel blockers are particularly effective (Nicholls and Sani 2003). Caution is needed when prescribing in the older adult population because of the changes that occur in pharmacokinetics and pharmacodynamics with age, which can result in older people being at higher risk of adverse drug reactions.

**HYVET study** The Hypertension in the Very Elderly Trial (HYVET) was an international clinical study investigating the effects of reducing blood pressure in those over 80 years. The study, which involved 3,845 patients, showed a reduction in the rate of stroke of 30% (P=0.06).

There was a 21% reduction (P=0.02) in the rate of death from any cause in the active group. The authors concluded that treatment with antihypertensive therapy in persons over the age of 80 years is beneficial (Beckett et al. 2008). This study shows the importance of treating people to manage hypertension, regardless of age.

**Low dose diuretic use in hypertension** The HYVET study also showed that older people can benefit from diuretic therapy. Participants in the study received indapamide sustained release 1.5mg. Perindopril 2mg or 4mg could be added if required (Beckett et al. 2008).

Hypertension guidelines recommend a thiazide-type diuretic as first choice for initial antihypertensive therapy in people aged over 55 years (National Collaborating Centre for Chronic Conditions 2006). Indapamide is a loop diuretic that is particularly useful for treating hypertension in patients with poor renal function (British National Formulary (BNF) 2009). It may

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**TABLE 1**

<table>
<thead>
<tr>
<th>Blood pressure reference range</th>
<th>Systolic (mmHg)</th>
<th>Diastolic (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal</td>
<td>&lt;120</td>
<td>&lt;80</td>
</tr>
<tr>
<td>Normal range</td>
<td>120-129</td>
<td>80-84</td>
</tr>
<tr>
<td>High normal range</td>
<td>130-139</td>
<td>85-89</td>
</tr>
<tr>
<td>Grade 1 hypertension (mild)</td>
<td>140-159</td>
<td>90-99</td>
</tr>
<tr>
<td>Grade 2 hypertension (moderate)</td>
<td>160-179</td>
<td>100-109</td>
</tr>
<tr>
<td>Grade 3 hypertension (severe)</td>
<td>≥180</td>
<td>≥110</td>
</tr>
<tr>
<td>Isolated systolic hypertension</td>
<td>&gt;140</td>
<td>&lt;90</td>
</tr>
</tbody>
</table>

(Adapted from the European Society of Hypertension-European Society of Cardiology Guidelines Committee 2003)
also have a neutral effect on blood glucose and lipids (Beckett et al. 2008).

**Renal function and ageing** Older people are more susceptible to the effects of drugs because renal clearance reduces as people age (National Prescribing Centre 2000, Reddy 2006). At the age of 75 years, renal function is estimated to be no more than 50% of normal function and decline in renal function has major implications when prescribing for older adults (Rang et al. 1996).

Thiazide and related diuretics are fully effective only when renal function is normal or minimally impaired. Because of declining renal function in the older adult, low-dose diuretics should be given initially and patients should be treated according to the results of ongoing assessment of their renal function. Results from serum creatinine are needed to obtain an estimate of renal function, and this allows for more accurate prescribing and dosing of the medication (Nicholls and Sani 2004).

**Diabetes in the older adult**

Diabetes is estimated to affect approximately 20% of people aged over 65 years (Mooradian et al. 1999). In addition to other known complications of diabetes – for example retinopathy and neuropathy – macrovascular complications (myocardial infarction and stroke) cause significant morbidity and mortality (Mooradian et al. 1999).

While age should not be a factor in influencing the treatment of people with diabetes, it is recommended that treatment should be applied with caution in older people. Older adults with diabetes are predisposed to hypoglycaemia (National Collaborating Centre for Chronic Conditions 2008).

The clinician should avoid pursuing highly intensive management of HbA1c to levels of under 6.5% (Hairon 2008). HbA1c is defined as ‘glycated haemoglobin, which identifies average plasma glucose concentration’ (Diabetes.co.uk 2010). By measuring HbA1c over time, an average blood glucose reading can be obtained.

Realistic target levels for diabetes treatment are random blood glucose levels of 8-11 mmol/L (Hull 2008). When treating diabetes in the older population, treatment should be individualised and tailored to people’s needs and lifestyle (Mooradian et al. 1999, Hull 2008), just as it is in younger age groups. Managing diabetes involves a considerable element of self-care. Informed decisions about care and treatment should be made in partnership with patients and healthcare professionals (National Collaborating Centre for Chronic Conditions 2008).

**Role of metformin** Metformin is an antidiabetic drug that decreases gluconeogenesis (synthesis of glucose to prevent blood glucose levels from dropping too low) and increases peripheral utilisation of glucose. It is effective only if there are some residual functioning pancreatic islet cells (BNF 2009). The advantages of using metformin, particularly in older people, include the fact that hypoglycaemia resulting from drug administration is unlikely (BNF 2009). Clinical studies have shown that metformin reduces cardiovascular morbidity and mortality and may exert preventive and curative effects (Wiernsperger 2007).

Metformin is a first-line treatment for type 2 diabetes (National Collaborating Centre for Chronic Conditions 2008); however, caution is indicated in older people, as it is excreted by the kidney. Because of the decline in renal failure that often affects older people, distortions in drug metabolism may result in accumulation of, and adverse events from, the drug (Reddy 2006). The serum creatinine and estimated glomerular filtration rate should be checked before commencing therapy and at least two to four times a year in older people. The dose of metformin should be adjusted appropriately according to the results of these tests (National Collaborating Centre for Chronic Conditions 2008).

**Common prescribing issues in older adults**

It is reported that up to 59% of older people fail to adhere to medication regimens, and this can result in approximately 10% of unplanned hospital admissions (Banning 2004). One study found that only 34% of people who were given metformin medication as monotherapy took it as prescribed (Hall 2007). Possible reasons for non-concordance include failure to address the preferences and needs of the patient, and psychological problems such as depression and anxiety. Concordance may be improved through effective counselling, which seeks to help the individual understand his or her treatment options and how to take prescribed medications (Hall 2007).

Older people often have more than one concurrent illness, which may necessitate the use of more than one medication (Watson 2000, Reddy 2006).Polypharmacy means ‘many drugs’ and is also used to refer to ‘the administration of more medications than is clinically indicated’, which can trigger medicines mismanagement (Dingwall 2007). Potential causes of polypharmacy are listed in Box 1 and some key considerations when prescribing for older adults are outlined in Box 2.
Case study

Edith is an 80-year-old female who lives alone independently in a large old terrace house with steps. She has two supportive sons who live nearby. She has two cats. Edith is a retired publican and still has an active social life with many friends. She goes out nearly every day either to meet up with friends or go to the shops.

Edith was experiencing symptoms of dizziness and headaches and feeling unsteady on her feet, which caused her to have a fear of falling. She exhibited some anxiety about going out of the house in case she had a fall that could result in losing her independence and becoming housebound.

Her past medical history includes hypertension, type 2 diabetes, osteoarthritis, left total hip replacement and phacoemulsification of the lens (cataract surgery). Edith was initially referred to a community matron by her GP because both her hypertension and diabetes were poorly controlled, resulting in frequent hospital admissions.

Edith’s blood pressure was 190/95mmHg. She was taking an angiotensin-converting inhibitor (ramipril) and a calcium channel blocker (felodipine). A random capillary blood glucose test was 9.9 mmol/L. A venous blood sample was then taken to measure HbA1c, which was reported as 8.5%.

Edith reported feeling dizzy, particularly in the morning on getting out of bed. The dizziness had resulted in two falls (without injury). On examination she was found to have postural hypotension, and a medication review revealed that she was not taking her medicines as prescribed. She had stopped taking one of her antihypertensives (felodipine) because she thought this was for anaemia and felt she did not need this particular tablet. It also transpired that Edith was taking a double dose of ramipril.

Edith was confused about her medications and this made it difficult to acquire an accurate account of her medication regimen. Edith and the community matron discussed the use of a medication concordance aid in the form of a blister pack, and Edith agreed to this. The use of a blister pack would enable Edith to be more knowledgeable and competent in taking her medicines and allow the healthcare professional to monitor concordance.

Edith told the community matron she drank two glasses of white wine each evening. To assess an accurate alcohol intake, Edith was asked what size glass she poured the wine into; the answer was two half pint glasses filled to the top. This equates to approximately 39 units of alcohol a week. Edith was also a smoker.

Over time, Edith reduced her alcohol intake. Alcohol misuse in older people is an underestimated and neglected problem that needs to be addressed when undertaking holistic assessment (Dyson 2006).

As Edith did not have any physical symptoms of diabetes, her perception of the possible consequences of the complications of the condition was low. A full explanation of the importance of good diabetes control was offered, but Edith felt that at her age she should not be expected to adhere to a strict diet.

Edith’s diet consisted of large quantities of fried food, cakes, sweets and biscuits with numerous cups of coffee a day.

Edith was offered a referral to a dietician, to which she agreed. The community matron observed the subsequent consultation and learned how to address dietary issues and work...
in partnership with the patient to develop an individualised care plan. Supportive literature was given to Edith to read.

**Outcome** Following regular monitoring and improved concordance with treatment, Edith’s HbA1c level fell to 7.1% and her blood pressure was 140/80 mmHg. Urea and electrolyte blood levels are checked regularly. Information provision and education on maintaining good self-management skills are ongoing. A combination of negotiation, education reinforcement, appropriate follow up and monitoring has resulted in Edith having a better understanding of her hypertension and diabetes, which has improved her concordance with her medication.

The symptoms of headache and dizziness have now resolved. Edith reports feeling much better with her medication.

This case study illustrates the importance of active management of long-term conditions in older adults. Effective medicines management and regular review, as well as ongoing education, have helped Edith to maintain an active and independent life, resulting in a reduction in hospital admissions.

**Conclusions**

The literature demonstrates that there is no reason to deny older people treatment for hypertension and diabetes, and decisions on whether older people get treatment should be based on evidence, not supposition or prejudice (Hull 2008). This article has identified some common challenges in clinical practice and offered possible solutions to achieve effective management in hypertension and diabetes in the older adult. The incorporation of clinical guidelines based on current evidence into care can help achieve positive outcomes for patients. The aim is to improve and enhance the quality of life for older people by providing care that is based on individual needs.

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**References**

- Banning M (2004) Enhancing concordance with prescribed medication in older people. Nursing Older People. 16, 1, 14-17