Hypertension -- Its Detection, Prevalence, Control and Treatment in a Quality Driven British General Practice

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A practice survey of hypertension management has suggested that hypertension prevalence in the UK may be less than previously thought. This article discusses the survey and its implications.

Abstract and Introduction

Abstract

This study evaluated primary care hypertension management against UK quality targets and prescribing guidelines through a survey of 738 hypertensives in an urban three-partner personal list practice in April 2005. It looked at screening rates, prevalence, blood pressures of under 150/90 mmHg, measurement bias, ABCD prescribing and cost.

The survey found that 94% of adults aged 25-79 years had been screened. With 738 confirmed cases, prevalence was 11.7% for all ages; 14.4% for those aged more than 16 years; and 46% in those over 65 years of age. Some 442 patients had 'potential' hypertension with their last blood pressure measurement being greater than 140/90 mmHg but inadequate follow-up. Blood pressure control of less than 150/90 mmHg was achieved in 83% of hypertensives with a six-fold terminal zero measurement bias. Looking at ABCD agents, 1,186 had been prescribed (1.84 per patient) costing £129,100 per annum.

We believe that QOF hypertension prevalence in the practice (11.7%) and England (11.3%) is less than half the rate reported from community surveys. The practice demonstrated that QOF outcome targets are achievable by improving blood pressure targets to under 150/90 mmHg from 52% of patients in 2002 to 83% of patients by April 2005. Practice organisation, personal patient lists and quality targets were important factors in delivering successful care. Automated blood pressure measurement could eliminate observer bias. Restructuring therapy repeat instructions to include ABCD data encourages logical prescribing.

Introduction

Hypertension is the commonest chronic disease in British primary care. Estimates of prevalence vary according to the precise diagnostic definition used, but the 1998 Health Survey for England found that 37% of adults over 16 years of age had a blood pressure (BP) of more than 140/90 mmHg.[1] The 2004 UK Quality and Outcomes Framework (QOF) set evidence-based targets for blood pressure control that are rewarded with performance-related pay[2] and has released detailed quality scores for the first year of the programme for every practice in England (see www.ic.nhs.uk/services/qof). Modern guidelines for the diagnosis and treatment of hypertension have been widely publicised by the British Hypertension Society (BHS)[3] and the National Institute for Clinical Excellence (NICE).[4] In addition, the BHS has introduced a simple ABCD algorithm for the stepwise prescribing of antihypertensive drugs.[5] Our practice has followed the progress of its hypertensive patients for some years[6] and this paper explores how successfully partners have met quality standards for BP control and prescribing by ABCD agent.
**Setting and Design**

Bury is a town in North West England with a population of 188,881 and a socioeconomic mix close to the mean for England and Wales. Our training practice in Central Bury has a list size of 6,300 of average age structure and a mildly deprived population (Jarman Score 9.9). Each of the three partners cares for a strict personal list of patients providing continuity of care and easy comparison of partner performance. Hypertension management was assessed on April 1st 2005 and medication by drug group in September 2004.

**Screening and Prevalence**

As 70% of patients consult their GP annually and over 90% attend in five years, opportunistic screening during routine surgery consultations is an effective method of screening for raised BP and other cardiovascular risk factors. We found 94% of 4,233 adults aged 25-79 years had a BP record within the previous five years. The number of confirmed hypertensives (defined as already on treatment or BP > 140/90 mmHg on three or more occasions) has risen steadily from 564 in January 2002 to 738 in April 2005; an increase of 31% giving a current prevalence of 11.7% for all age groups. The mean age of hypertensives was 67.9 years with a sex distribution of 58.4% female, 41.6% male. As hypertension is a condition of adults, the Health Survey for England in 1998 expressed prevalence for those aged over 16 years. Since prevalence climbs with increasing age, this needs to be broken down further by age band (figure 1). Our current prevalence for those aged over 16 years is 12.1% for men, 16.7% for women, 14.4% for both sexes and 46% for patients over 65 years.

![Figure 1](http://www.medscape.com/viewarticle/521162_print)  
**Figure 1.**  
Hypertension prevalence (age and sex)

**Potential Hypertensives and Co-Morbidity**

The practice has 442 'potential hypertensives' whose last recorded BP was more than 140/90 mmHg but for whom unsuccessful recall has not allowed a diagnosis of hypertension to be confirmed or refuted. Previous follow-up of similar patients by serial BP measurement has shown that around half turn out to have hypertension. Many patients with hypertension suffer from cardiovascular co-morbidities with 11% on registers for stroke or transient ischaemic attack (TIA), 6% for coronary heart disease (CHD) and 15.3% for diabetes. Of the practice's 232 diabetics, 24% of type 1 diabetics and 53% of type 2 diabetics had hypertension. Of all the hypertensive patients, 15% still smoked and 30% had a body mass index greater than 30 compared with only 18% of an age and sex matched practice population.
Quality Measures

The five QOF hypertension indicators (see table 1) illustrate the three principles of clinical audit - structure, process and outcome. On April 1st 2005 (National Quality Evaluation Day) our practice was one of 222 out of 8,576 in England (2.6%) to achieve maximum quality points of 1,050. We easily met all five quality indicators for hypertension without recourse to exception reporting, gaining 100% points (average for England 94.4%). With 56 points, the BP indicator 5 justifiably carries the highest score of any target in the entire clinical framework. The practice exceeded the 70% threshold with 83% of BPs being less than 150/90 mmHg. Control in men was 83.7% and, in women, 81.6%. It is important to emphasise that the QOF outcome target of 150/90 mmHg is a minimum audit standard and not the target for hypertensive control which remains at 140/85 mmHg for non-diabetics in the UK. Only 59% of patients achieved this more exacting standard of clinical control.

Diastolic blood pressure (DBP) proved easier to control than systolic blood pressure (SBP) with 93% of DBP < 90 mmHg compared with 88% of SBP < 150 mmHg. However, a stand-alone SBP of 150 mmHg would have served as a reliable criterion for quality control in all but 11 hypertensives (1.5%) with a DBP over 90 mmHg but a SBP below 150 mmHg.

Measurement Bias

One concern about setting performance-related targets based on clinical measurement is that some element of observer bias may occur. In 2004-05 our practice used calibrated, large dial, wall mounted Speider & Keller Maxi-Stabil sphygmomanometers, one of the few aneroids to have validated accuracy.[7] Twelve-fold terminal zero bias has been reported for GPs using non-automated sphygmomanometers.[8] Our results were checked for bias and demonstrated a terminal zero preference (but only of 6.6). Figure 2 also shows some bias towards the clinical SBP target of 140 mmHg but not to the 150 mmHg audit threshold required to meet Quality Indicator 5.

![Systolic blood pressure measurement bias](source_image)

Prescribing of Antihypertensive Drugs

In September 2004, 650 hypertensives were on medication - 646 on ABCD agents and a further 70 on no medication, either because of recent diagnosis, non-drug treatments or drug intolerance. The 650 were collectively
prescribed 1,186 ABCD antihypertensive drugs, 63 non-ABCD drugs (alpha blockers and the centrally-acting drug moxonidine) plus a further 397 co-morbidity drugs (statins and aspirin). The annual cost of therapy was approximately £129,100 i.e £198.61 per treated hypertensive patient.

Table 2 explores the classes of hypertensive drugs prescribed by partners. Diuretics were the most popular choice at 55%, closely followed by 50% for angiotensin-converting enzyme (ACE) inhibitors and angiotensin II receptor blockers (ARBs).

Table 3 shows the numbers of ABCD agents prescribed for each patient and the percentage of hypertensives on different therapeutic steps of the BHS algorithm. From this it is easy to calculate the number of agents per treated hypertensive by partner, a useful yardstick for monitoring prescribing. Table 3 also correlates treatment steps with the success of BP control and shows control improving from 69% to 79% as the number of agents increased from one to three. There was a small fall to 68% when four agents were used but patients who require four agents are more likely to suffer from resistant hypertension.

Discussion

Prevalence of Hypertension

Reliable estimates of primary care prevalence require high screening levels and careful follow-up to confirm diagnosis. Our screening uptake of 94% is the highest reported from a UK practice but follow-up of 442 potential hypertensives has been inadequate. If diagnosis was confirmed in half of these potential hypertensives, the practice hypertensive population would rise to 959, making the prevalence in over 16 years, 18.7%, still far short of the commonly cited 37% figure from the 1998 Health Survey for England. Similarly, our prevalence of 46% in the over 65 years population is considerably lower than the recent large British survey of Primatesa and Poulter[9] that found 81% of over 65s had BPs over 140/90 mmHg. Our April 2005 all age prevalence of 11.7% is similar to that of the 189,000 Bury PCT population (11.28%) and national QOF data for England (11.3%), Wales (12.48%), Scotland (11.7%) and Northern Ireland (10.04%). Projected English QOF data puts the current confirmed hypertensive population at around 5.97 million.

It is intriguing why there is such a gulf in prevalence reported by front-line practitioners and community research surveys. The answer is likely to lie within differing approaches to methodology, screening, accuracy of measurement and confirmation of diagnosis. The 1998 Health Survey for England recruited by postal invitation with a response rate of 78%. BP was measured automatically three times at five-minute intervals on a single home visit by a research nurse; the average of the second and third readings was used to identify patients with a BP > 140/90 mmHg.

This total was added to hypertensives already on treatment to give the over 16 years prevalence of 37%, a result that must now be viewed with caution. It is likely to be an overestimate of true prevalence because serial readings were not repeated on different days.

Organisation of Hypertensive Care

Of the 10 steps necessary for successfully tackling hypertension, British general practitioners (GPs) are responsible for delivering eight, namely steps 2-8:

- Step 1. Clear evidence-based guidelines
- Step 2. Reliable BP measurement
- Step 3. Screening of practice populations
- Step 4. Confirmation of diagnosis
- Step 5. Engaging patients with personal care plans
- Step 6. Non-pharmacological interventions
- Step 7. Prescribing acceptable medication
- Step 8. Reducing other cardiovascular risk
- Step 9. Follow-up to ensure good BP control
- Step 10. Specialist care for special cases.

Some authorities have questioned the achievability and desirability of current BP targets from the QOF, BHS and
Like most UK practices, we have demonstrated that QOF hypertension targets are achievable by boosting the percentage of patients with a BP < 150/90 mmHg in the preceding nine months from 52% in June 2002 to 83% in April 2005 (average for Bury 74.6% and England 71%). Operating strict personal lists helped both the organisation of hypertensive care and patient concordance. Continuity of care has previously been recognised as an important factor in delivering successful hypertensive care. Birtwhistle concluded that the quality of the doctor-patient encounter, the doctor’s awareness of guidelines, clinical inertia and treating the patient rather than the number, were all very relevant.

**BP Measurement Bias**

The bias in BP measurement confirmed in this study suggests that to achieve a more objective picture of hypertensive control, GPs must adopt automatic sphygmomanometry. Once blood pressure approaches or exceeds target levels, accuracy becomes of paramount importance because it can influence therapy and bias may also distort the validity of QOF data. Terminal digit bias is just one of many factors that influence BP measurement, a topic reviewed in detail by Marshall. We have introduced automated sphygmomanometers for 2005/06.

**Prescribing of ABCD Drugs**

Detailed analysis of antihypertensive prescribing patterns showed much idiosyncratic choice of medication with each partner prescribing from a selection of favourites. But when therapy was analysed by ABCD class there was little difference except for diuretics, where there was a 26% variation. Most practice prescribing predates the publication of the BHS-IV guidelines in March 2004 and NICE guidelines of August 2004 but the ratio of ABCD agents prescribed per patient has increased from 1.74 in 2002 to 1.84, a trend in line with BHS recommendations.

One simple way to ensure that GPs focus on the appropriate choice of ABCD drugs is to change the way computerised therapy repeats are formulated. Including the reason for prescribing is helpful to patients and receptionists and adding the drug class letter in brackets encourages the doctor to consider therapeutic choices more carefully. Some examples are given below:

- Perindopril tabs 8 mg
  One each morning for BP (A1)
- Atenolol tabs 50 mg
  One each morning for BP (B)
- Amlodipine tabs 10 mg
  One each morning for BP (C)
- Bendroflumethiazide tabs 2.5 mg
  One each morning for BP (D)

One further refinement to facilitate logical prescribing is to carefully record adverse effects and intolerances to agents that have been tried and withdrawn.

**Recommendations for QOF**

The Quality and Outcomes Framework has focussed the hearts and minds of primary care teams on taking hypertension more seriously with encouraging outcome results. Much remains to be done but annual feedback is likely to be a powerful force for diagnosing new hypertensives and improving control. Building on this success, the framework could be strengthened by:

- Increasing the two organisational screening targets for BP recording in patients over 45 years from 55% and 75% to 70% and 90%.
- Introducing a new organisational target to promote the regular calibration of sphygmomanometers.
- Promoting annual re-assessment of hypertensive smokers.
- Encouraging tighter BP control with a second clinical outcome band < 140/85 mmHg.

**Ethical Approval**
Ethical approval was not required for this qualitative study.

Table 1. Hypertension Quality Indicators and Points

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Audit structure - register</th>
<th>Target</th>
<th>Practice (%)</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP 1</td>
<td>Hypertension register patients</td>
<td>Register</td>
<td>738 (100)</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td><strong>Audit process - results recorded</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BP 2</td>
<td>Smoking status recorded</td>
<td>90%</td>
<td>738 (100)</td>
<td>10</td>
</tr>
<tr>
<td>BP 3</td>
<td>Smokers' cessation advice at least once</td>
<td>90%</td>
<td>109 (100)</td>
<td>10</td>
</tr>
<tr>
<td>BP 4</td>
<td>Quality BP check in last nine months</td>
<td>90%</td>
<td>692 (94)</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td><strong>Audit outcomes - BP control</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BP 5</td>
<td>Quality &lt; 150/90 mmHg in last nine months</td>
<td>70%</td>
<td>609 (83)</td>
<td>56</td>
</tr>
<tr>
<td>BP &lt; 140/85 mmHg in last nine months</td>
<td></td>
<td>433 (59)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total available points</td>
<td></td>
<td></td>
<td>105</td>
</tr>
</tbody>
</table>

**Key:** BP = blood pressure

Table 2. Prescribing of ABCD Drugs by Class

<table>
<thead>
<tr>
<th>Groups of ABCD drugs used</th>
<th>GP1 (%)</th>
<th>GP2 (%)</th>
<th>GP3 (%)</th>
<th>Practice (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients prescribed ABCD drugs</td>
<td>212 (51)</td>
<td>215 (45)</td>
<td>219 (54)</td>
<td>646 (50)</td>
</tr>
<tr>
<td>A - ACE inhibitor or ARB</td>
<td>109 (51)</td>
<td>97 (45)</td>
<td>119 (54)</td>
<td>325 (50)</td>
</tr>
<tr>
<td>A1 - ACE inhibitor</td>
<td>55 (26)</td>
<td>53 (25)</td>
<td>74 (34)</td>
<td>182 (28)</td>
</tr>
<tr>
<td>A2 - ARB</td>
<td>54 (25)</td>
<td>44 (20)</td>
<td>45 (21)</td>
<td>143 (22)</td>
</tr>
<tr>
<td>B - Beta blocker</td>
<td>78 (37)</td>
<td>84 (39)</td>
<td>82 (37)</td>
<td>244 (38)</td>
</tr>
<tr>
<td>C - Calcium channel blockers</td>
<td>81 (38)</td>
<td>69 (32)</td>
<td>94 (43)</td>
<td>244 (38)</td>
</tr>
<tr>
<td>D - Diuretics</td>
<td>144 (68)</td>
<td>103 (48)</td>
<td>106 (48)</td>
<td>353 (55)</td>
</tr>
<tr>
<td>E - Extras (alpha blockers and moxonidine)</td>
<td>5 (2)</td>
<td>30 (14)</td>
<td>32 (15)</td>
<td>67 (10)</td>
</tr>
<tr>
<td>Annual cost</td>
<td>£32,200</td>
<td>£37,400</td>
<td>£59,500</td>
<td>£129,100</td>
</tr>
</tbody>
</table>

**Key:** ACE = angiotensin-converting enzyme; ARB = angiotensin II receptor blockers

Table 3. Number of ABCD Drugs Prescribed

<table>
<thead>
<tr>
<th></th>
<th>GP1 (%)</th>
<th>GP2 (%)</th>
<th>GP3 (%)</th>
<th>Practice (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP &lt; 150/90</td>
<td></td>
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</table>
### Sidebar: Key Messages

- Screening rates > 90% and blood pressure control (> 70% < 150/90 mmHg) are achievable with good practice organisation and QOF incentives
- There are around six million confirmed hypertensives in England but QOF prevalence (11.3%) is less than half the rate reported from community surveys
- GPs could eliminate measurement bias by using automated sphygmomanometers and improve prescribing by restructuring therapy repeat instructions to include ABCD data

###Acknowledgements

- Birtwhistle R, Godwin M, Delva M *et al.* Randomised equivalence trial comparing three and six months of follow-up of patients with hypertension by family practitioners. *BMJ* 2004; 328:204-06.

###References

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Conflict of interest: PS has lectured on hypertension management at events sponsored by Merck Sharp & Dohme and Solvay.