Prevalence of treated hypertension in general practice in England and Wales, 1994 to 1998

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This study estimates the prevalence of treated hypertension in general practice in England and Wales between 1994 and 1998. The data comes from the analysis of the electronic patient records of 209 general practices that contributed to the General Practice Research Database. In 1998 the crude prevalence of treated hypertension was 79.9 per 1,000 patients (66.8 in males and 92.7 in females). This represents a 21 per cent increase in crude prevalence compared with 1994. About a quarter of this increase was due to the ageing population. Prevalence was 17 per cent higher in females than males in 1998, after we took account of age differences between them. A difference of 22 per cent in prevalence between practices in the least and most deprived wards was shown to be entirely associated with the age structure of the practices. There was a 26 per cent and 29 per cent difference in the prevalence of treated hypertension between the practices for males and females respectively, after taking their age structures into account.

Introduction

Hypertension is abnormally high blood pressure, sustained over a period of time. It is associated with an increased risk of heart disease, stroke, kidney failure and other diseases involving the blood vessels. For example, men with treated hypertension have twice the risk of death from cardiovascular disease and stroke than those with normal blood pressure.[1] Because the diseases that hypertension contributes to are major causes of ill-health and death in the population, the identification and treatment of people with hypertension is a key area of disease management for the National Health Service.

The most common form of hypertension (essential hypertension) has no single identifiable cause but obesity, lack of exercise, and excess alcohol and salt intake are all contributory factors. Hypertension is managed in general practice using a range of drugs that reduce blood pressure and by lifestyle changes. Drug treatment is likely to be started at lower blood pressure levels for some groups of patients. This includes patients who already have one of the diseases mentioned above and those who are at high risk of developing cardiovascular disease. Family history, sex, age, cholesterol levels and the presence of diabetes are taken into account when predicting this risk.

The Health Survey for England (HSE) estimated that 20 per cent of people aged 16 years and over were hypertensive in 1998,[2] using the blood pressure thresholds recommended in the 1993 British Hypertension Society guidelines.[3] About 60 per cent of these people were treated with a blood-pressure lowering drug. The recommended blood pressure thresholds for treating patients were lowered in 1999,[4] so there is likely to be an increase in the prevalence of treated hypertension for this reason alone from that date.

Although the management of hypertension has been addressed in other studies, the current study contributes important information to the area in three respects. Our data were gathered directly from a large set of primary care records, rather than from interviews with a sample of the population. As a result, we were able to describe the variation in prevalence between practices in addition to differences over time and with age and sex. As we looked at the same practices in each year, we can be more confident that any apparent differences over time were due to real changes in treatment within the practice, rather than any effect of sampling. We also used a larger group of practices than other studies that looked at interpractice variation.[5,6]

Methods

Data source

The data for this study came from 209 general practices in England and Wales contributing data to the General Practice Research Database (GPRD). Their combined practice population was approximately 1.2 million people in 1998. The GPRD was operated by the ONS during the period covered by this study. The Medicines Control Agency has been responsible for the database since 1999.

General practices participating in the GPRD follow agreed guidelines for the recording of clinical and prescribing data. They submit anonymised patient-based clinical records to the database at regular intervals. The comprehensiveness and accuracy of the data recorded in the GPRD has been documented previously[7] and the database has been used extensively for epidemiological research.

This study used an aggregated extract from the GPRD, used in the production of *Key Health Statistics from General Practice 1998* (KHS).[8] The 209 practices were selected because they were all situated in England and Wales; they contributed data to the GPRD throughout the period 1994 to 1998 and their data passed regular quality checks. The practices' combined population had a similar age-sex composition to that of England and Wales in 1998.

Case and rate definition

Counts of the numbers of patients and cases in the practices were carried out for each of the five years, 1994 to 1998. Patients were included in the count if they were alive and permanently registered at the practice on the last day of the year and had been registered for at least 6 months before that date. Therefore, patients who died during the year were excluded and more mobile population groups are under-represented.

Cases of treated hypertension were defined as patients who had a diagnosis of hypertension recorded in the analysis year or in an earlier year and a prescription in the analysis year for a relevant drug from Chapter 2 of the British National Formulary (BNF). The relevant BNF sections used were: 2.2.1, 2.2.3, 2.2.4, 2.4, 2.5.1, 2.5.2, 2.5.3, 2.5.4, 2.5.5, 2.6.1 and 2.6.2. This includes the diuretics, beta-blockers, ACE inhibitors, nitrates, calcium-channel blockers and other antihypertensive drugs used in general practice.

Calculation of rates

We produced crude and/or age-standardised rates for three major areas of interest for treated hypertension: changes in prevalence between 1994 and 1998, differences in prevalence between practices in more and less deprived areas and variation in prevalence between the practices themselves. The crude rates give an indication of the workload for GPs and the age-standardised rates make an allowance for differing age distributions between the years 1994 and 1998, between areas that are more or less deprived and between the practices themselves. These age-standardised rates also allow direct comparisons to be made with other European countries. We calculated these rates by applying the age-specific rates, in 5-year age groups (except for ages 10–15 and ages 16–19), from age 0 until 85 and over, to the European standard population. GPs who wish to see how their practice compares with those used in this study should age-standardise their rates using the European standard population and compare them with the interquartile ranges in Table 3.

Deprivation

The five deprivation categories (Q1–Q5) used in Table 2 were derived using the Townsend Material Deprivation Score.[9] Each of the 209 practices was assigned to one of these categories based on the ward in which the practice was located. Practices in Q1 were located in the least deprived fifth of England and Wales and practices in Q5 were located in the most deprived fifth of England and Wales.

The Townsend Score itself is a composite score calculated using information on unemployment, overcrowding, car availability and home ownership derived from the 1991 Census. The higher the score, the greater the level of relative deprivation. In order to work out which ward belonged in which category, the Townsend Score for each ward in England and Wales was arranged in ascending order of Townsend Score along with the total population of that ward in 1991. The wards were then divided into the five deprivation categories (Q1–Q5), each of which contained one-fifth of the total population of England and Wales.

Interpractice variation

We calculated the age-standardised prevalence as well as the overall crude prevalence for each sex in each of the practices. As blood pressure generally increases with age, practices with younger populations may appear to have lower overall rates of high blood pressure than those with older populations due solely to their different age structures. Age-standardisation minimises this effect. Additionally, practices with extremely high or low rates may give a falsely wide impression of the range. The inter-quartile range (25th percentile to 75th percentile) was therefore calculated in addition to the complete range for each sex. The inter-quartile range excludes practices with extreme rates and can provide a more accurate estimate of the variation in prevalence between the practices.

Results

Changes in prevalence by year, age group and sex in England and Wales

There were increases in prevalence for almost all age groups in each year between 1994 and 1998. The crude prevalence of treated hypertension was 79.9 cases per 1,000 patients in 1998. This represents a 21 per cent increase compared with 1994. This increase was reduced to 16 per cent after allowing for changes in the age structure of the population between the two years. The greatest increases in prevalence between the two years were in males and females aged 85 and over (58 and 36 per cent respectively) and there were increases of between 11 and 28 per cent in each of the other age groups (Table 1).

Treated hypertension was more common in females than males in each age group in each of the five years, though the percentage increase in prevalence between 1994 and 1998 in males was greater than or equal to that in females in each of the age groups. Overall, the crude prevalence of treated hypertension was 39 per cent higher in females

Table 1 **Prevalence of treated hypertension per 1,000 patients, by age group, sex and calendar year, 1994 and 1998**

England and Wales

	Age group							Crude rate (all ages)	Age-standardised rate (all ages)*
	0–34	35–44	45–54	55–64	65–74	75–84	85 and over		
Males									
1994	1.4	18.2	64.9	145.2	221.0	221.0	127.4	54.6	51.8
1998	1.7	20.2	73.7	164.6	260.9	282.7	201.7	66.8	60.6
% change 1994–98	21	11	14	13	18	28	58	22	17
Females									
1994	2.0	19.3	69.7	169.6	266.4	301.3	214.4	77.8	61.8
1998	2.4	21.4	79.8	188.7	303.7	369.7	291.4	92.7	70.9
% change 1994–98	20	11	14	11	14	23	36	19	15
Both									
1994	1.7	18.7	67.3	157.4	245.5	270.6	191.2	66.3	57.4
1998	2.0	20.8	76.7	176.5	283.6	335.5	266.7	79.9	66.3
% change 1994–98	18	11	14	12	16	24	39	21	16

* Direct age-standardisation using the European standard population.

than males in 1998 (92.7 per thousand for females and 66.8 per thousand for males). This gap was reduced to 17 per cent after allowing for differences between the age structure of the two sexes.

Variation by deprivation category in England and Wales

Treated hypertension was 22 per cent more common in practices from the least deprived areas than in those from the most deprived areas (Table 2). However, after account was taken of the different age structure of the two types of area there was little visible difference: prevalence in the most deprived areas was 1 per cent higher than that in the least deprived areas. There was no consistent rise or fall in prevalence with increasing deprivation and the age-standardised prevalence of each of the area types (Q1–Q5) was within 5 per cent of each of the others.

Variation in prevalence between the general practices

The prevalence of treated hypertension differed by up to 26 per cent in males and 29 per cent in females between the practices themselves, after excluding extreme values and allowing for differences in the age structure of the practices (the age-standardised interquartile range) (Table 3). The interquartile range in prevalence before age-standardisation was 58.3–79.7 per thousand for males and 78.5–109.0 per thousand for females. Therefore, age-standardisation reduced the interpractice variation by about a third in males and a quarter in females.

Discussion

Principal findings

The prevalence of treated hypertension increased between 1994 and 1998 in England and Wales. Approximately a quarter of this 21 per cent increase can be attributed to the ageing of the population during this period. Though prevalence was 39 per cent higher in females than males, over half of this difference was due to the different age structure of the sexes. There was little variation in prevalence with deprivation once an allowance was made for the differences in the age structure of the practice populations in each area. Prevalence varied by up to 39 per cent from practice to practice. Over a quarter of this variation was due to differences in the age structure of the practices.

Table 2 **Prevalence of treated hypertension per 1,000 patients by deprivation category, 1994–98**

England and Wales

	Crude rate	Age-standardised rate*	(95% CI)†
Deprivation quintile			
Q1: least deprived	80.1	62.9	(62.4,63.4)
Q2	76.8	60.3	(59.9,60.7)
Q3	71.2	60.8	(60.4,61.2)
Q4	77.6	63.8	(63.4,64.2)
Q5: most deprived	65.7	63.6	(63.2,64.0)

* Direct age-standardisation using the European standard population.
† 95% confidence interval for age-standardised rate.

Strengths and weaknesses of the study

The GPRD is widely used for epidemiological research and the practices used in this study passed a number of quality checks before their data was used. Their combined population was about 2.5 per cent of the national populations and had a similar age/sex distribution in 1998. They were also distributed throughout the National Health Service areas of England and Wales.

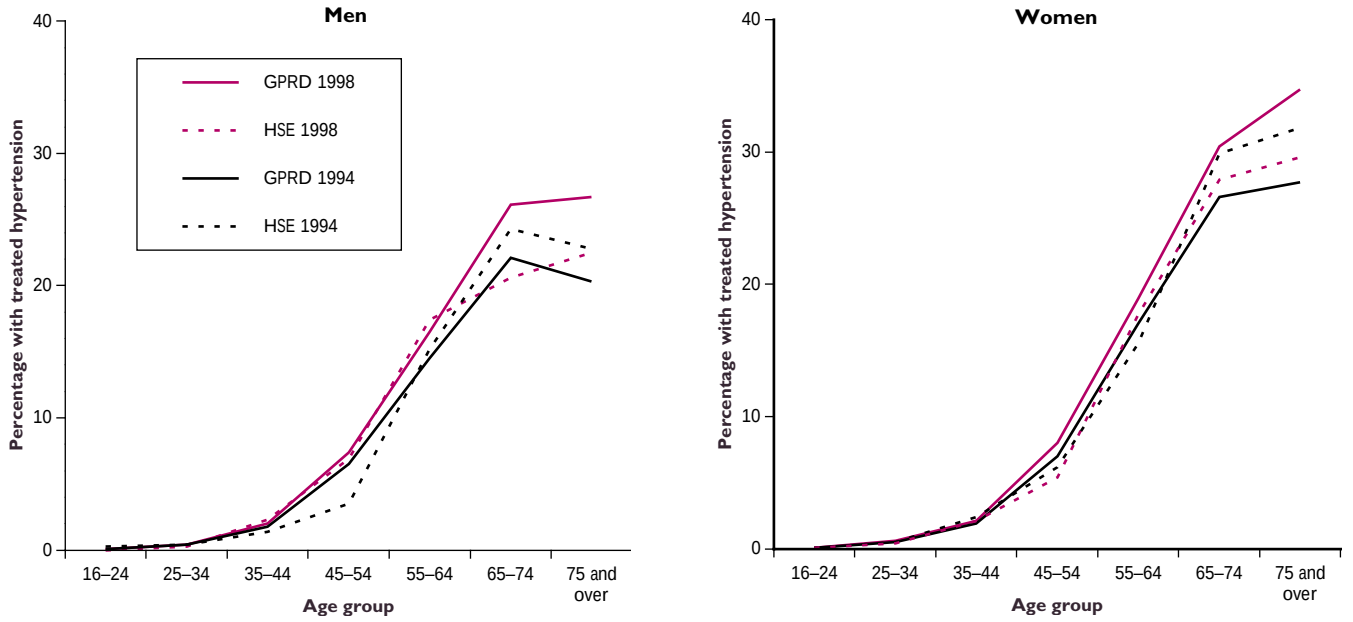
Table 3 **Interpractice variation in the age-standardised prevalence* of treated hypertension per 1,000 patients by sex, 1998**

209 general practices

	Median	Range	25th percentile	75th percentile
Males	60.4	34.7-144.0	54.6	68.7
Females	69.8	44.6-168.0	62.0	80.0

* Direct age-standardisation using the European standard population.

Figure 1 Comparison of GPRD and HSE prevalence of treated hypertension by age group, 1994 and 1998



The study only counts cases of hypertension which are known and treated. Other sources of data, like the Health Survey for England, may provide comparisons of how the disorder itself is distributed in the population and inequalities in its detection and treatment.[10,11] GPRD contains data on patient co-morbidities and other factors which may help describe and explain the observed increases in more detail. However, the current study was based on the aggregated subset of the database made available for the production of KHS and did not contain this information.

The definition of a case excluded patients who died during the analysis year. As hypertension is associated with increased mortality, we may have underestimated the age-specific prevalence in older age groups to some extent. Patients with a diagnosis of hypertension, but no prescription for one of the relevant drugs in the analysis year fell outside our definition of a case. Similarly, if a patient was hypertensive at some time in the past and is currently being prescribed a relevant drug for some other reason, then they will be included as a case incorrectly.

It was possible that improved recording of hypertension over the study period might have caused some of the increase in prevalence found in the study. In order to address this, we carried out one of the GPRD's standard quality checks for our group of antihypertensive drugs. The proportion of prescription records with an associated indication remained constant over the study years. This suggests that the increases seen were due to factors other than improvements in recording, for example, increased case ascertainment.

Lastly, we looked for hypertension that was both diagnosed and treated, rather than the presence of hypertension itself. As the disorder is often asymptomatic, some patients will have been undiagnosed. Nor were we able to control for factors that may have influenced the decision to treat, such as the presence of other cardiovascular risk factors and their related blood pressure thresholds. Some of the variation found may have been attributable to these two factors.

Comparison with other studies

The Health Survey for England from 1994 and 1998 was used as some of its measures were comparable with our study. The participants had their blood pressure measured and were asked about the purpose of any prescribed medication. If their blood pressure was above a certain threshold they were regarded as being hypertensive. Participants were regarded as being treated for hypertension in 1994 and 1998 if they reported that the medication that they took was prescribed for high blood pressure, regardless of their blood pressure at interview. The intervening years were excluded from the comparison because they had a much wider definition of treatment. Figure 1 compares the age and sex specific prevalence of treated hypertension found in our study and in the HSE. They both show an increase in prevalence with age up to the oldest age groups and an increase between the two years in almost all cases. Our data shows a more consistent increase in age specific prevalence across the age groups and between the two years. This is probably because the participation of a larger number of patients and the use of the same practices for each year in our study resulted in smaller random variation between the age groups and across the two years.

It was not possible to make direct comparisons between the variation in prevalence between practices in more and less deprived areas from our study, and variation in the prevalence of treated hypertension in people from differing social classes in the HSE. We did find that there was little variation in the prevalence of treated hypertension in 1994 with increasing deprivation in either sex after age-standardisation when we carried out a separate analysis for adults in this year alone. By contrast, in the same year, HSE data showed that women from Social Class V (the lowest social class) were 1.5 times more likely to have high blood pressure than those in Social Class I (the highest social class), after age standardisation. It is possible that the higher risk of having hypertension in women from the lowest social class may be compensated for by higher treatment rates in practices from the most deprived areas. However, a detailed analysis of the HSE data on treatment would be necessary to draw any firm conclusions.

The interpractice variation in the crude prevalence of treated hypertension that we observed among 209 practices in 1998, before age-standardisation, was more than three times wider than that found in another study based on six practices, published in 1997.[5] A later report, using 33 practices, quoted a range in the prevalence of diagnosed hypertension in adults that was about half as wide as ours.[6] Neither of these studies, however, allowed us to compare the ranges after age-standardisation, so some of the range in prevalence observed in these studies may have been due to differences in the age structure of the participating practices.

Implications for policy and practice

Our findings showed that the proportion of the population receiving treatment for hypertension increased substantially between 1994 and 1998. About a quarter of this increase was due to the ageing population. Much of the remainder can probably be accounted for by the increased awareness of the importance of treating hypertension[2,12] and the publication in 1989 and 1993 of the British Hypertension Society guidelines for the treatment of hypertension.[3,13] The publication of the 1999 guidelines, in which the blood pressure levels for treating hypertension were lowered, will lead to a further increase in the prevalence of treated hypertension. Hopefully, these higher treatment rates will lead to a reduction in the complications of hypertension among those receiving treatment. However, higher treatment rates will also lead to a greater workload for members of primary health care teams and greater spending on drug treatment and patient monitoring. Finally, the high degree of concordance between treatment rates in the Health Survey for England and our own study (particularly among younger age groups) suggest that data from primary care databases could be used in the future to monitor the management of hypertension in the community. Data from general practice computer systems will become increasingly available as the NHS Information Technology Strategy is developed and the computerisation of general practices increases further.[14]

Key findings

- The prevalence of treated hypertension in England and Wales was 80 per 1,000 people in 1998.
- Prevalence was 17 per cent higher in females than in males in 1998 after making an allowance for the differences in their age structure.
- Between 1994 and 1998 the prevalence of treated hypertension increased by one fifth. This was reduced to one sixth after taking account of the ageing population.
- The prevalence of treated hypertension differed by up to 25 per cent between practices, after taking account of the differences in their age structure.
- There was very little difference in the prevalence of treated hypertension in practices located in the least deprived and most deprived wards once an allowance was made for the differences in their age structure.

Conclusions

There was a large increase between 1994 and 1998 in the proportion of the population receiving treatment for hypertension. This suggests that general practitioners and practice nurses are identifying and treating more patients with hypertension. Further research will be needed to determine if these higher treatment rates are resulting in a reduction in the complications of hypertension in the population.

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