Prevalence and Management of Heart Failure in General Practice in England and Wales, 1994–98

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This paper examines the prevalence and management of heart failure in England and Wales using data that comes from the General Practice Research Database. In 1998, the crude rate of treated heart failure was 12.2 per 1,000 males and 15.8 per 1,000 females compared to 11.9 per 1,000 males and 16.3 per 1,000 females in 1994. Between 1994 and 1998, the percentage of heart failure patients prescribed ACE inhibitors increased from 37 to 53 per cent in men and from 30 to 44 per cent in women. The percentage of heart failure patients prescribed beta-blockers increased from 9 to 11 per cent in men and from 10 to 11 per cent in women. The findings suggest that management of heart failure in primary care is changing to reflect current guidelines.

Introduction

Heart failure is a common, serious and disabling disease (see Box 1). In the general population it affects between 3 and 20 individuals per 1,000.[1] Its prevalence increases with age and amongst those aged 75 years and over it affects between 80 and 160 individuals per 1,000.[1] It has an overall five-year survival rate of 25 per cent in men and 38 per cent in women[2] comparable to that of colorectal cancer.[3] Heart failure is also the commonest cause of hospital admission among those aged 65 and over, and accounts for 1-2 per cent of total NHS healthcare expenditure. About 70 per cent of this total cost is due to hospital care.[4] Heart failure also reduces patients' quality of life more than illnesses such as diabetes and hypertension.[5]

The National Service Framework (NSF) for Coronary Heart Disease (CHD) aims to improve access and quality of care for patients with a number of cardiovascular disorders including heart failure by establishing standards for prevention and treatment.[6] There is evidence to suggest that many people with heart failure are not receiving optimal treatment.[7,8] The basis for medical treatment of heart failure depends on drugs that traditionally have included diuretics and digitalis, and more recently Angiotensin Converting Enzyme (ACE) inhibitors and beta-adrenoceptor blocking drugs (beta-blockers). Randomised controlled trials have shown that ACE inhibitors can improve patients' symptoms, reduce the progression of their disease and reduce their need for hospital admission by approximately 30 per cent.[9,10] However, studies have found that only a minority of patients receives ACE inhibitors[11,12] despite them being a cost-effective intervention.[13,14] Recent research findings suggest that beta-blockers can also reduce the mortality rate and the number of hospital admissions for any cause in selected patients with heart failure.[15]

An earlier paper in *Health Statistics Quarterly* 04[16] examined the prevalence and management of heart failure in England and Wales during the period 1994–96 using diagnosis recorded in general practice. The objectives of this study are to extend the analysis to more recent years by presenting prevalence rates of heart failure and examining time trends in prescribing for patients with heart failure over the period 1994–98. We have included three new drug types (cardiac glycosides, diuretics and beta-blockers) in the prescribing analysis. A further objective is to examine how the prevalence and management of heart failure varied with area deprivation in 1998.

Box one

Heart failure

Heart failure is a clinical syndrome that occurs when the heart is unable to pump enough blood to meet the demands of the body. Some people with mild heart failure may have very few symptoms. Patients with moderate or severe heart failure suffer from a number of problems including shortness of breath (particularly when lying flat), waking up suddenly at night with a feeling of breathlessness, general tiredness, swelling of the feet, ankles and legs, rapid weight gain and chronic cough. Heart failure is a serious condition with a poor prognosis and one that can markedly reduce the quality of life.

Heart failure has many causes. The commonest cause is ischaemic heart disease. Other causes include problems with the heart muscle (cardiomyopathy), high blood pressure (hypertension), problems with any of the heart valves, abnormal heart rhythms (arrhythmias) and excess alcohol. The diagnosis is sometimes unclear from the history and examination and usually has to be confirmed by investigations such as chest x-ray or echocardiography.

Heart failure is treated in several ways. The aims of treatment are to reduce progression of the disease, reduce hospitalisation and extend life. A very important aspect of treatment is dealing with any underlying problems such as high blood pressure. The main groups of drugs used to treat heart failure are:

ACE inhibitors. ACE inhibitors help open (dilate) arteries and lower blood pressure, thus improving blood flow.

Diuretics. Diuretics are often called water pills because they keep fluid from building up in the body. They can also decrease the amount of fluid that collects in the lungs, which helps breathing.

Beta-blockers. Beta-blockers can improve blood flow and may help prevent some heart rhythm problems.

Digoxin. Digoxin can help the heart to pump better.

Current treatment guidelines for heart failure can be found in *Diagnosis and Treatment of Heart Failure due to Left Ventricular Systolic Dysfunction* developed by the Scottish Intercollegiate Guidelines Network.[17]

Methods

Data source

The data for this study came from 211 general practices, total list size 1.4 million, in England and Wales contributing data to the General Practice Research Database (GPRD). This is one of the largest studies to examine the prevalence and management of heart failure in general practice in the United Kingdom. The GPRD was originally set up in 1987 by VAMP Ltd. and was subsequently acquired by Reuters Health Information Ltd. who donated it in 1994 to the Department of Health. The Medicines Control Agency (MCA) has been responsible for the overall management and financial control of the database since April 1999. The Office for National Statistics (formerly the Office of Population Censuses and Surveys) operated the database between 1994 and 1999.

General practices participating in the GPRD follow agreed guidelines for the recording of clinical and prescribing data, and submit anonymised patient-based clinical records to the database at regular intervals. Initially all practices contributing to the database used VAMP Medical practice software. However, roughly a quarter of the 378 practices currently contributing (March 2001) now use ViSion practice software. Their data were not available for analysis when this work was undertaken but the MCA has since made these data available. The comprehensiveness and accuracy of the data recorded in the GPRD has been documented previously.[18] The database has been used extensively for epidemiological research.

The practices included in this study are the same practices used for the analysis in *Key Health Statistics from General Practice 1998*[19] (KHS98), the third in a series of reports which contains morbidity and treatment data derived from the GPRD. The 211 practices were selected because they were situated in England and Wales, they contributed data to the GPRD throughout the period 1994–98 using VAMP Medical practice software and their data passed quality checks. The combined population of the practices had a similar age-sex composition to that of England and Wales.[19]

Case and rate definition

Firstly we examined trends in the prevalence of treated heart failure in England and Wales by age and sex over the period 1994–98. Patients with treated heart failure in a specific year were defined as those who have had a diagnosis of heart failure ever-recorded, and treatment with either diuretic drugs, ACE inhibitors or cardiac glycosides (digoxin) in the calendar year of interest. We calculated crude and age-standardised rates (all ages). The crude rates give an indication of the workload for GPs and the age-standardised rates allow us to assess the true change in prevalence over time and the difference between the sexes by adjusting for differing age distributions both between the sexes and over the period 1994–98. We calculated the age-standardised prevalence rates by applying the age-specific rates, by 5-year age groups up to age 84 (except 10–15 and 16–19) and then 85 and over, to the European Standard population.

Secondly we examined the prescribing of specific types of drugs for patients with treated heart failure. More specifically we considered the percentage of patients with treated heart failure prescribed ACE inhibitors, diuretics, cardiac glycosides or beta-blockers. These drug treatments are not mutually exclusive, heart failure patients can receive more than one type of drug at the same point in time or during the same calendar year. Patients were recorded as having been prescribed any of the above if they had at least one prescription for the drug during the year. Again, we analysed both crude and age-standardised rates.

However, this time we calculated the age-standardised prescribing rates by applying the prescribing percentages by 5-year age groups (as above) to a different standard population. The standard population used was the estimated number of cases of treated heart failure in England and Wales in 1994. This standard population was derived by applying prevalence rates of treated heart failure in the 211 practices, for the males and females combined, to the estimated population of England and Wales in 1994 by the same age groups.

We have included beta-blocker data in the study although only two beta-blockers are currently licensed for use in heart failure in Britain as compared to many more licensed ACE inhibitors. Traditional medical teaching was that beta-blockers aggravate heart failure but recent evidence suggests that some patients with milder symptoms can benefit from treatment with selected beta-blockers.[20]

Inter-practice variation

We calculated the crude prevalence of treated heart failure and the percentage of patients with the disease prescribed ACE inhibitors and beta-blockers individually for each of the 211 practices. We calculated these rates separately for males and females for 1998 only. The inter-quartile range (25th percentile to 75th percentile) gives an indication of the range of prevalence rates of treated heart failure amongst the 211 practices having excluded the values at the extremes of the distribution. All 211 practices had a list size of more than 1,000 patients in 1998.

Deprivation

Key Health Statistics from General Practice 1998[19] presents prevalence rates of several diseases by deprivation category. The deprivation categories were derived using the Townsend Material Deprivation Score.[21] This is a composite score calculated using information on unemployment, overcrowding, car availability and home ownership derived from census data. The higher the score, the greater the level of relative deprivation in that area. Each of the wards in England and Wales was allocated a Townsend score. These scores were then put in ascending order along with the total population of each ward in 1991. The wards were divided into 5 groups each of which contained 20 per cent of the population of England and Wales in 1991. A range of Townsend scores describes each of these population quintiles. Each practice was allocated to a quintile on the basis of the Townsend Score of the ward in which it is located. The quintiles are named Q1, Q2, Q3, Q4 and Q5; Q1 contains the least deprived wards and Q5 contains the most deprived wards.

It was not possible to obtain ward information for one of the 211 practices and data for this practice were therefore not included in the deprivation analysis. Prevalence rates of treated heart failure and prescribing rates of ACE inhibitors and beta-blockers to patients with treated heart failure were calculated for this study by deprivation quintile using the remaining 210 practices. We calculated the age-standardised prevalence rates for those aged 45 and over by applying age-specific rates (45–54, 55–64, 65–74, 75–84, 85 and over) to the European standard population. Similarly, we calculated the age-standardised prescribing rates by applying age-specific rates for these age groups to the estimated number of cases of treated heart failure in 1998. Those aged under 45 were excluded from the deprivation analysis as the number of cases of heart failure in this age range was extremely low, resulting in unreliable age-specific rates.

Results

Prevalence of treated heart failure in England and Wales

There was a fall in the overall prevalence of treated heart failure in males over the five-year period 1994–98. The age-standardised prevalence rate decreased by 1.9 per cent from 10.4 to 10.2 per 1,000 patients (Table 1). The crude rate rose from 11.9 to 12.2 per 1,000 patients (2.2 per cent increase). Prevalence of the disease in males increased with age from 0.1 per 1,000 patients aged 0–34 to 190.7 per 1,000 patients aged 85 and over in 1998. The greatest increase in prevalence was to men aged 35–54 between 1994 and 1998. Prevalence in the 85 and over age group also rose while rates in all other age groups fell.

The overall prevalence of treated heart failure was lower in females than males throughout the 5-year period 1994–98. The age-standardised rate for females fell by 4.5 per cent from 8.9 to 8.5 per 1,000 patients (Table 1). The crude rate fell 3.4 per cent from 16.3 to 15.8 per 1,000 patients. As for males, the female prevalence rate increased with age. The 45–54 age group was the only female age group that showed an increase in the prevalence of treated heart failure (4.3 per cent) over the 5-year period.

The findings for the 0–34 age group for both males and females are not discussed further. This is because the prevalence of treated heart failure in this age group is very low (0.1 per 1,000 patients) compared to other age groups.

Table 1 **Prevalence of treated heart failure in England and Wales per 1,000 patients, by age and sex, 1994–98**

	Age								
	0–34	35–44	45–54	55–64	65–74	75–84	85 and over	Crude rate	Age-standardised rate
Males									
1994	0.1	0.4	2.4	14.5	46.7	114.2	184.1	11.9	10.4
1995	0.1	0.4	2.6	14.6	45.7	112.0	184.1	11.9	10.4
1996	0.1	0.5	2.8	14.9	44.8	109.0	183.6	12.0	10.3
1997	0.1	0.4	2.6	14.4	45.9	110.1	182.9	12.1	10.3
1998	0.1	0.4	2.7	13.9	44.9	108.6	190.7	12.2	10.2
% change 1994–98	-45.3	11.7	10.3	-4.7	-3.9	-4.9	3.5	2.2	-1.9
Females									
1994	0.1	0.4	1.7	9.6	37.7	105.6	202.3	16.3	8.9
1995	0.1	0.3	1.6	9.7	36.9	102.5	197.2	16.1	8.8
1996	0.1	0.3	1.7	9.8	36.7	100.9	191.6	16.0	8.7
1997	0.1	0.3	1.7	9.4	36.4	100.5	185.9	15.9	8.6
1998	0.1	0.3	1.8	9.2	35.8	98.6	188.8	15.8	8.5
% change 1994–98	-19.0	-28.2	4.3	-3.6	-5.1	-6.7	-6.6	-3.4	-4.5

Source : General Practice Research Database.

Table 2 shows that the estimated number of cases of treated heart failure in England and Wales remained stable between 1994 and 1998 at around 3/4 million.

Prescribing of specific types of drugs for patients with treated heart failure in England and Wales

For both males and females the percentage of patients with treated heart failure prescribed ACE inhibitors or beta-blockers increased whereas the percentage prescribed diuretics or cardiac glycosides decreased between 1994 and 1998 (Table 3).

ACE inhibitors

Throughout the study period younger men with treated heart failure were more likely to be prescribed ACE inhibitors than older men. However, the increase in the use of these drugs was greater at older ages. For example, in 1994, 66.7 per cent of men aged 45–54 with treated heart failure were prescribed ACE inhibitors, rising to 71.6 per cent in 1998 (a 7.3 per cent increase), compared with 34.0 per cent of men aged 75–84 prescribed ACE inhibitors in 1994, rising to 52.1 per cent in 1998 (a 53.2 per cent increase). There was considerably less variation across age groups in the prescribing of ACE inhibitors in women, although, as for men the percentage of women with treated heart failure prescribed ACE inhibitors was particularly low in the oldest age group. However, as a result of a 72.5 per cent increase in prescribing rates in this age group, the magnitude of the difference decreased between 1994 and 1998.

Beta-blockers

In 1994 the level of prescribing of beta-blockers was much lower than for the other drug types at each age. The age-standardised prescribing rate of beta-blockers increased by 22.9 per cent among men between 1994 and 1998 compared with an increase of 14.5 per cent among women. As was the case for ACE inhibitors, younger patients with treated heart failure were more likely to be prescribed beta-blockers than were older patients.

Diuretics

The percentage of males with treated heart failure prescribed diuretics decreased by 3.3 per cent (from an age-standardised rate of 94.2 to 91.1 per cent) between 1994 and 1998. This is compared to a smaller decrease in the age-standardised prescribing rate of diuretics to women (95.3 to 93.5 per cent). However, it remained by far the most commonly prescribed type of drug.

Cardiac Glycosides

The cardiac glycoside age-standardised prescribing rates of patients with treated heart failure decreased by 5.9 per cent among men and 12.7 per cent among women between 1994 and 1998. Prescribing rates for cardiac glycosides were substantially less varied across age groups than ACE inhibitors and beta-blockers.

Inter-practice variation

Table 4 shows that the crude prevalence of treated heart failure varied widely between the 211 practices included in the analysis in 1998. The prevalence rates were between 1.9 and 34.1 cases per 1,000 patients for men and between 0.7 and 37.6 cases per 1000 patients for women. The inter-quartile range was 8.9 to 15.0 for male rates and 11.5 to 19.9 for female rates. The correlation between the prevalence of treated heart failure in men and women in the same practice was highly statistically significant, $r=0.69$ ($p<0.01$).

The percentage of patients with treated heart failure within each practice prescribed ACE inhibitors in 1998 ranged from 0 to 100 per cent for both men and women. The inter-quartile range was 48.5 to 63.8 per cent for men and 33.3 to 49.6 per cent for women. Only two out of the 211 practices were recorded as prescribing none of their female patients with treated heart failure ACE inhibitors and only one practice as prescribing none of their male patients. The median percentage of males prescribed ACE inhibitors in 1998 was 56.1 per cent and the median for females was 42.9 per cent. The correlation between the percentage of men and women in each practice prescribed ACE inhibitors was statistically significant ($r=0.38$, $p<0.01$).

There was substantially less inter-practice variation in the percentage of patients with treated heart failure prescribed beta-blockers. For both sexes the prescribing rate in 1998 ranged from 0.0-33.3 per cent. For men, the inter-quartile range was 6.6 to 15.1 (median 10.6) and for women 6.1 to 13.1 (median 9.1). The correlation between the percentage of male and female patients prescribed this type of drug in the same practice is not statistically significant ($r=0.07$, $p=0.28$). Of the 211 practices analysed, 24 (11.4 per cent) did not prescribe beta-blockers to any of their male patients with treated heart failure and 22 (10.4 per cent) did not prescribe any to their female patients. Only 4 practices did not prescribe beta-blockers to any male or female patients.

Deprivation

Table 5 shows that for both men and women the age-standardised prevalence rate of treated heart failure was lowest in the least deprived

Table 2 **Total population and estimated number of cases of treated heart failure in England and Wales, 1994 and 1998**

Age	Total Population 1994 (000s)	Estimated number of cases of treated heart failure 1994	Total population 1998 (000s)	Estimated number of cases of treated heart failure 1998
0–34	24,896	3,100	24,522	2,100
35–44	6,925	2,700	7,515	2,700
45–54	6,474	13,400	6,904	15,400
55–64	5,122	61,800	5,199	60,100
65–74	4,644	194,200	4,400	176,200
75–84	2,642	287,700	2,871	294,400
85 and over	917	181,100	1,017	192,500
Total	51,620	744,000	52,428	743,400

Source: Office for National Statistics.

Table 3 **Prescribing of specific types of drugs for patients with treated heart failure in England and Wales, by age and sex, 1994–98**

	Age								
	0–34	35–44	45–54	55–64	65–74	75–84	85 and over	Crude rate	Age-standardised rate
Males									
Percentage prescribed ACE inhibitors									
1994	40.6	71.4	66.7	57.1	45.7	34.0	20.8	39.8	37.3
1995	57.9*	82.4	72.5	61.1	50.6	39.2	22.5	44.4	41.5
1996	52.2*	73.7	73.7	66.1	56.8	46.1	28.3	50.4	38.4
1997	65.0*	73.0	75.5	69.2	59.6	49.8	32.9	53.6	51.1
1998	65.0*	74.4	71.6	71.5	63.1	52.1	33.8	55.5	53.1
% change 1994–98	-	4.2	7.3	25.2	38.1	53.2	62.5	39.4	42.5
Percentage prescribed diuretics									
1994	90.6	82.1	87.9	89.0	93.7	95.6	95.5	93.9	94.2
1995	78.9*	67.6	85.2	89.3	92.4	94.9	97.0	93.3	93.9
1996	65.2*	71.1	82.6	87.7	90.9	93.3	96.9	91.8	93.9
1997	60.0*	86.5	81.3	86.0	89.9	93.2	95.8	91.2	91.9
1998	60.0*	92.3	78.2	84.7	89.6	91.9	95.4	90.4	91.1
% change 1994–98	-	-12.4	-11.0	-4.8	-4.4	-3.9	-0.1	-3.7	-3.3
Percentage prescribed cardiac glycosides									
1994	31.3	28.6	25.5	21.7	28.9	32.2	29.8	29.3	29.6
1995	31.6*	17.6	25.4	21.8	28.9	31.8	28.7	28.9	29.1
1996	21.7*	13.2	26.3	20.8	28.9	31.2	29.1	28.6	28.7
1997	25.0*	13.5	26.4	19.1	27.8	29.8	28.5	27.5	27.8
1998	25.0*	20.5	25.3	21.9	27.5	29.8	27.3	27.6	27.8
% change 1994–98	-	-28.3	-0.8	0.9	-4.8	-7.5	-8.4	-5.8	-5.9
Percentage prescribed beta-blockers									
1994	9.4	14.3	16.4	15.9	11.7	7.5	2.7	9.5	8.6
1995	15.8*	26.5	16.4	16.3	10.8	7.5	2.2	9.2	8.3
1996	4.3*	26.3	13.6	16.6	11.8	7.1	4.0	9.6	10.2
1997	10.0*	24.3	17.8	15.7	12.6	8.0	4.1	10.2	9.3
1998	5.0*	28.2	21.0	17.5	14.2	9.5	4.2	11.5	10.6
% change 1994–98	-	97.2	28.0	10.1	21.4	26.7	55.6	21.1	22.9
Females									
Percentage prescribed ACE inhibitors									
1994	39.3	39.3	37.6	38.0	36.3	29.8	18.2	28.3	30.2
1995	50.0*	44.0	45.5	43.1	40.9	34.8	22.3	33.0	34.9
1996	42.3	36.0	48.4	43.4	45.2	39.0	25.4	36.6	38.4
1997	50.0*	40.7	51.9	49.4	48.2	41.7	27.8	39.5	41.5
1998	42.3	48.0	56.6	50.4	49.1	44.0	31.4	41.7	43.6
% change 1994–98	7.6	22.1	50.5	32.6	35.3	47.7	72.5	47.3	44.6
Percentage prescribed diuretics									
1994	89.3	89.3	93.6	93.5	94.1	96.0	96.8	95.6	95.3
1995	80.0*	96.0	88.2	94.5	92.8	95.5	96.5	95.1	94.7
1996	84.6	92.0	87.5	91.8	92.6	94.4	96.3	94.3	93.9
1997	77.3*	88.9	91.6	91.4	92.1	94.1	96.3	94.1	93.6
1998	76.9	92.0	93.8	91.1	91.8	94.1	96.0	94.0	93.5
% change 1994–98	-13.9	3.0	0.2	-2.6	-2.4	-2.0	-0.8	-1.7	-1.9
Percentage prescribed cardiac glycosides									
1994	32.1	21.4	20.2	27.6	28.5	32.9	34.4	31.9	31.2
1995	40.0*	28.0	20.9	23.3	27.5	31.3	32.5	30.3	29.6
1996	34.6	12.0	20.3	24.3	26.0	30.2	32.3	29.4	28.7
1997	22.7*	18.5	16.8	22.1	24.2	28.9	31.5	28.1	27.2
1998	30.8	12.0	17.9	22.2	24.4	28.7	31.8	28.2	27.2
% change 1994–98	-4.0	-43.9	-11.4	-19.6	-14.4	-12.8	-7.6	-11.6	-12.7
Percentage prescribed beta-blockers									
1994	3.6	21.4	13.8	16.5	14.1	8.4	4.0	8.8	10.0
1995	5.0*	24.0	11.8	17.3	12.9	9.4	4.1	9.1	10.1
1996	3.8	24.0	14.1	14.7	13.1	10.0	4.2	9.2	10.2
1997	9.1*	22.2	16.0	17.6	13.5	8.7	4.8	9.2	10.2
1998	7.7	20.0	13.1	16.8	15.3	10.6	5.2	10.3	11.4
% change 1994–98	113.9	-6.5	-5.1	1.8	8.5	26.2	30.0	17.0	14.5

* Rates calculated with fewer than 25 cases of treated heart failure patients are indicated with an asterix. Their reliability may be affected by the small number of cases. When either the 1994 or 1998 rate is based on fewer than 25 cases, no figure is given for the percentage change (shown by -).

Source : General Practice Research Database.

quintile and highest in the most deprived quintile in 1998. For men, there was an 18 per cent higher prevalence in quintile five (the most deprived) than quintile one (the least deprived) and for women a 35 per cent higher prevalence in the most deprived quintile. The differentials between the quintiles are particularly large at the younger ages.

The prescribing of specific types of drugs to patients with treated heart failure varies across the deprivation quintiles with no clear prescribing patterns evident.

Discussion

Main findings

Our study confirms that heart failure is a very common condition and its prevalence increases with age.[1] The prevalence of heart failure in our study of between one and two per cent is consistent with that found by other researchers. It is largely a disease of the elderly, with prevalence greater than 100 cases per 1,000 patients at age 75 and above and less than 1 per 1,000 patients for those aged under 45.

The age-standardised prevalence rate of treated heart failure in general practice was higher in men than in women (although the crude rate was higher for women). Surprisingly the rate fell in both sexes between 1994 and 1998 as did the age specific rates in most age groups. However, as the number of older people increased, the estimated number of cases of heart failure in England and Wales remained stable over this five-year period. This is an unexpected result as it is thought that the population burden of heart failure is increasing as a result of both an ageing population and a greater proportion of people surviving heart attacks but being left with residual ventricular dysfunction.[5]

Our study showed that the use of ACE inhibitors in patients with treated heart failure increased by over 40 per cent in both men and women during the period 1994–98. In 1998, 53 per cent of men were prescribed ACE inhibitors as compared to 44 per cent of women. We found that in women the increase in use of ACE inhibitors since 1994 was greatest for those aged 45 years and over. However, women and men in the older age groups were less likely to be treated with ACE inhibitors in 1998.

Unfortunately we are unable to tell from this study whether some of these patients not receiving ACE inhibitors are ineligible for this type of drug. Nevertheless, the results indicate that there is still scope to increase the uptake of ACE inhibitors, especially among women and the elderly. Current advice on achieving this objective may include raising the awareness of the public health importance of heart failure and the clinical benefit and cost-effectiveness of ACE inhibitors.[6] Another aim of the NSF is to improve access to echocardiography, as patients with heart failure are more likely to be prescribed an ACE inhibitor if they have had their diagnosis confirmed with an echocardiogram.[10]

Our study showed that over the period 1994–98 the age-standardised prescribing rates for beta-blockers in patients with treated heart failure increased for both sexes. This increase was slightly higher in men. As was the case for ACE inhibitors, we found that older women and men with treated heart failure were less likely to be prescribed beta-blockers than patients in the younger age groups. Overall levels of beta-blocker use in patients with treated heart failure were found to be low in our study. This result was not unexpected as their use was discouraged for many years in the management of heart failure. Only in the late 1990s did trials suggest significant benefits in terms of mortality and morbidity. Furthermore, current guidance is that hospital specialists should initiate beta-blocker treatment in patients with heart failure.[17]

We found that elderly men and women with heart failure were less likely to be prescribed ACE inhibitors and beta-blockers. Doctors may be more reluctant to change drug regimes and have greater concern about the adverse effects of these drugs among older patients. Older patients with long-standing heart failure may have had their condition diagnosed during a period when the evidence about the use of ACE-inhibitors was not well known. If their symptoms are well-controlled on diuretics and digoxin, clinicians may be reluctant to change their treatment. By contrast, younger patients with heart failure are likely to have had the condition for a shorter period of time and may well be started on an ACE-inhibitor early in the course of their disease. There is however evidence to suggest that GPs are beginning to prescribe elderly patients ACE inhibitors and beta-blockers; our study showed large percentage increases at older ages in the numbers prescribed the two treatments between 1994 and 1998.

Our inter-practice variation analyses show that the prevalence of treated heart failure varies widely from practice to practice. This could be explained by several factors, for example, a difference in detection and confirmation of the condition amongst health professionals, a difference in the completeness of recording by GPs submitting data to the GPRD, the relative deprivation level of the area in which the practice is located or a differing age-sex composition of patients in the practices. The inter-practice treatment analysis highlights that some practices treat patients with heart failure more effectively than others. Only one of the 211 practices included in the analysis did not prescribe either beta-blockers or ACE inhibitors to their heart failure patients in 1998. All other practices prescribed the majority of their heart failure patients ACE inhibitors in a given year.

Our study showed, using the Townsend score as an indicator of material deprivation, that prevalence of treated heart failure was highest in the most deprived areas. This result is consistent with the link between deprivation and ill health found for a number of conditions.[22] Interestingly, there was no link established between drug prescribing and deprivation.

Strengths and weaknesses of study

Our study was based on patients who had a diagnosis of heart failure recorded in their general practice record. Previous studies validating the clinical data recorded in the General Practice Research Database (GPRD) show that the recording of diagnoses is accurate.[18] A further criterion was used to ensure that only active cases of heart failure were included; patients had to have a diagnosis of heart failure ever recorded and to have had treatment with diuretic drugs, ACE inhibitors or cardiac glycosides during the year in question.

As a result of the large number of cases included, our study provides reliable estimates of prevalence and treatment of heart failure, including by age and sex. We were also able to examine time trends in the treatment of heart failure over a five-year period.

The main weakness of the study is that we did not validate the diagnosis of heart failure, for example, by examining whether patients had their diagnosis confirmed by an echocardiagram. As mentioned previously we are also unable to tell from our study whether any of the high percentage of heart failure patients not receiving ACE inhibitors and beta-blockers are in fact ineligible for these treatments. Asymptomatic cases of heart failure that had not come to the attention of their general practitioner will also not be included in our study.

There may also be some weaknesses in the prescribing data. Some heart failure patients may have their prescribing carried out entirely in secondary care and this would not necessarily be recorded by their GP. As mentioned previously, current guidance is that hospital specialists begin beta-blocker treatment for heart failure patients. Hence the prescribing of beta-blockers to patients with heart failure in our study may be an underestimate.

Table 4 **Inter-practice variation in the crude prevalence of and prescribing rates for treated heart failure in 211 practices in England and Wales, by sex, 1998**

	Median	Range	25th percentile	75th percentile
Males				
Prevalence per 1,000	12.2	1.9 to 34.1	8.9	15.0
Percentage prescribed ACE inhibitors	56.1	0.0 to 100.0	48.5	63.8
Percentage prescribed beta-blockers	10.6	0.0 to 33.3	6.6	15.1
Females				
Prevalence per 1,000	15.0	0.7 to 37.6	11.5	19.9
Percentage prescribed ACE inhibitors	42.9	0.0 to 100.0	33.3	49.6
Percentage prescribed beta-blockers	9.1	0.0 to 33.3	6.1	13.1

Source : General Practice Research Database.

Table 5 **Prevalence and management of treated heart failure in England and Wales, by age, sex and deprivation category, 1998**

		Age						
		45–54	55–64	65–74	75–84	85 and over	Crude rate	Age-standardised rate
Males								
Prevalence per 1,000	Q1 (least deprived)	1.7	10.0	39.7	102.7	213.2	28.0	25.9
	Q2	2.8	12.7	43.2	120.5	193.2	33.5	28.8
	Q3	2.7	13.1	41.8	101.6	184.8	29.1	26.8
	Q4	2.6	14.4	48.0	109.6	195.4	33.6	29.3
	Q5 (most deprived)	3.5	18.3	50.6	107.5	169.5	33.0	30.5
Percentage of treated heart failure patients prescribed ACE inhibitors	Q1 (least deprived)	66.7	65.9	65.7	51.8	38.7	55.0	53.2
	Q2	70.8	70.8	61.4	49.8	32.7	52.8	50.3
	Q3	71.9	71.9	64.5	54.2	36.0	57.1	53.7
	Q4	72.9	69.4	61.8	50.7	31.1	53.6	50.2
	Q5 (most deprived)	72.7	76.1	63.5	54.4	32.3	58.9	52.9
Percentage of treated heart failure patients prescribed beta-blockers	Q1 (least deprived)	23.8	18.2	13.5	11.6	3.0	11.5	10.6
	Q2	14.6	22.4	13.7	7.3	4.4	10.3	9.4
	Q3	19.3	16.6	14.3	9.1	5.0	11.3	10.1
	Q4	25.0	14.8	16.2	11.6	3.8	12.4	11.2
	Q5 (most deprived)	23.6	17.0	12.7	8.8	4.3	11.4	9.5
Females								
Prevalence per 1,000	Q1 (least deprived)	1.4	5.4	27.0	83.0	195.7	29.9	19.8
	Q2	1.3	7.8	35.4	99.7	199.2	38.8	23.6
	Q3	1.5	8.5	32.5	101.6	183.0	36.2	23.0
	Q4	2.0	9.6	37.7	106.8	184.9	40.7	25.1
	Q5 (most deprived)	2.6	14.0	43.9	93.6	186.1	39.7	26.8
Percentage of treated heart failure patients prescribed ACE inhibitors	Q1 (least deprived)	52.9	56.5	54.0	42.8	30.3	41.1	43.5
	Q2	59.1	50.5	45.2	43.4	30.7	40.0	41.4
	Q3	63.3	46.8	48.5	46.2	29.6	41.7	42.8
	Q4	62.2	48.6	51.6	46.2	33.6	43.8	44.7
	Q5 (most deprived)	46.2	53.0	48.3	39.4	32.1	40.9	40.9
Percentage of treated heart failure patients prescribed beta-blockers	Q1 (least deprived)	17.6	37.0	32.1	30.2	27.0	29.5	30.1
	Q2	13.6	14.4	23.4	28.6	32.2	28.0	26.8
	Q3	16.7	27.8	24.0	30.0	37.0	30.8	29.9
	Q4	21.6	17.9	21.2	26.7	29.4	25.8	25.3
	Q5 (most deprived)	17.9	22.0	25.6	29.2	31.1	28.0	28.0

Source : General Practice Research Database.

Key findings

- The age-standardised prevalence of treated heart failure fell between 1994 and 1998 by 1.9 per cent for men and 4.5 per cent for women.
- Prevalence rates of treated heart failure fell in most age groups between 1994 and 1998. However, with an ageing and growing population the number of cases in England and Wales remained constant over the period 1994–98.
- The prevalence of treated heart failure is highest in the most deprived areas and lowest in the least deprived areas.
- There was a more than 40 per cent increase in the prescribing of ACE inhibitors to men and women with heart failure over the period 1994–98.
- There was a large increase in the prescribing of beta-blockers to patients with heart failure but levels of prescribing still remain relatively low as compared to those of ACE inhibitors.

Conclusions

Rates of prescribing for ACE inhibitors are higher in the younger age groups. We are unable to identify whether this age difference in the prescribing of ACE inhibitors was clinically justified. Increasing the uptake of ACE inhibitors in patients with heart failure will reduce the levels of ill health experienced by heart failure patients and save lives. In this analysis of data from the GPRD, we were unable to look at co-morbidities or to examine the use of investigations to confirm the diagnosis of heart failure, such as chest x-ray or echocardiograph. We hope to analyse trends in both of these in future work. Future analyses will also allow us to assess whether the National Service Framework has helped to improve the management of heart failure patients.

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