

# MANAGEMENT OF HYPERTENSION IN ETHNIC MINORITIES

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*Heart* 2005;91:1105–1109. doi: 10.1136/hrt.2004.044560

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**H**ypertension, currently defined as a blood pressure > 140 mm Hg (systolic) and/or > 90 mm Hg (diastolic), is a common problem. In a western adult population the prevalence of hypertension exceeds 20%.<sup>1</sup> The prevalence of hypertension increases with age and is higher in ethnic minority groups in the UK. In the Health Survey for England (2001) the prevalence of hypertension was 3.3% in those aged < 40 years, 27.9% in those aged between 40–79 years, and 49.9% in those aged 80 years and older.<sup>2</sup>

The two main ethnic origin groups within the UK are the Afro-Caribbean and South Asians. The majority of studies have reported a higher prevalence and significantly higher mean blood pressure levels among both Afro-Caribbean populations and South Asians compared to their white counterparts.<sup>3</sup> In a south London community based study, compared with whites, age and sex standardised prevalence ratios for hypertension were 2.6 in people of African descent and 1.8 in those of South Asian origin.<sup>4</sup> However, average blood pressure varies between different subgroups of South Asians, being highest in Sikhs, similar to whites in Muslims, and intermediate in Hindus.<sup>5</sup> In addition, Indians have higher blood pressures, Pakistanis lower blood pressures, with Bangladeshis having even lower blood pressures than the native white population.<sup>6</sup>

## CONSEQUENCES OF HYPERTENSION FOR ETHNIC MINORITIES

Hypertension is a major risk factor for cardiovascular and cerebrovascular disease, the major causes of death in the UK and other western countries. Recent studies indicate substantial ethnic differences in cardiovascular mortality.<sup>7</sup> For example, compared to whites, Afro-Caribbean and people of African descent have a higher incidence of stroke<sup>8</sup> and end stage renal failure,<sup>9</sup> whereas coronary artery disease is less common. Conversely, South Asians (defined as people originating from the Indian subcontinent and East Africa) have a higher incidence of coronary heart disease.<sup>8</sup>

There is increased prevalence of left ventricular hypertrophy (LVH) in Afro-Caribbeans. This is thought to be, in part, due to their higher night time blood pressure with a smaller degree of nocturnal blood pressure dip. LVH is an independent predictor of morbidity and mortality. Ethnic differences in morbidity and mortality may, in part, be explained by the differences in other cardiovascular risk factors. Both diabetes mellitus and obesity are common in ethnic minority groups, with a high prevalence among Afro-Caribbean females.<sup>1</sup> Plasma lipid concentrations, however, show a different pattern with South Asians having higher concentrations than whites and Afro-Caribbeans having lower values. This may, in part, explain why, despite a high prevalence of hypertension and type 2 diabetes mellitus, coronary heart disease is less common in Afro-Caribbean than the other two ethnic groups.<sup>10</sup>

## PATHOPHYSIOLOGY OF HYPERTENSION IN ETHNIC MINORITIES

The pathophysiology of hypertension differs in black adults compared to South Asians and whites. For example, hypertension in this population is commonly of the low renin type (fig 1); sensitivity of blood pressure to salt intake is often increased, and the ability to excrete ingested salt is impaired (60–70%).<sup>11</sup> This leads to an overall expansion of intravascular volume. Obesity is especially prevalent in black women and is associated with an increase in total body sodium content.<sup>12</sup> Intake of dietary potassium, in the form of fruit and vegetables, is generally lower in blacks than in whites. Black patients may also have relatively higher concentrations of intracellular calcium.<sup>13</sup> All of these factors are associated with an increased incidence of hypertension.

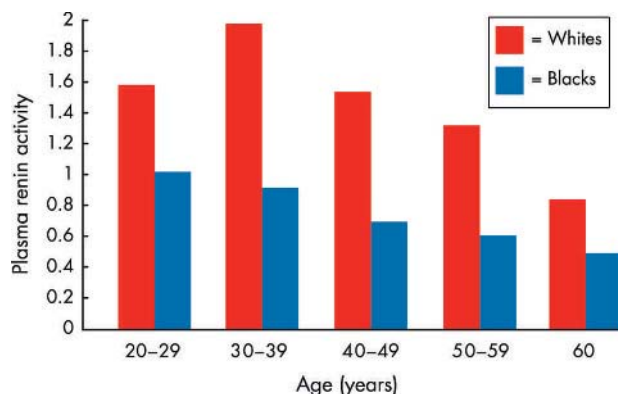
## MANAGEMENT OF HYPERTENSION IN ETHNIC MINORITIES

### Treatment with lifestyle modifications

Lifestyle modifications can result in improvements in blood pressure control. A 3.18 kg reduction in body weight can significantly reduce blood pressure.<sup>15</sup> An increase in potassium intake may

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**Figure 1** Plasma renin in black and white hypertensive patients. Adapted from Freis *et al.*<sup>14</sup>

also significantly reduce blood pressure in normokalaemic hypertensive patients.<sup>16</sup> This occurs, in part, because of a natriuretic effect of potassium.

In view of the increased sensitivity of black patients to salt, restricting dietary salt intake to less than 6 g daily is particularly effective at reducing blood pressure (fig 2).<sup>17</sup> Approximately 10% of hypertensive black adults (the percentage is higher in those who are very overweight) have an extremely high dietary sodium intake (that is, 24 hour urinary sodium excretion of 200–400 mmol per day, equivalent to a salt intake of 11–17 g daily) that is not suspected by either the patient or the physician. In these patients, it is impossible to control blood pressure adequately without using a diuretic or providing very specific dietary counselling to identify food(s) high in sodium. Optimising weight, reduction in unsaturated fat intake, and regular exercise also improves cardiovascular risk profiles.

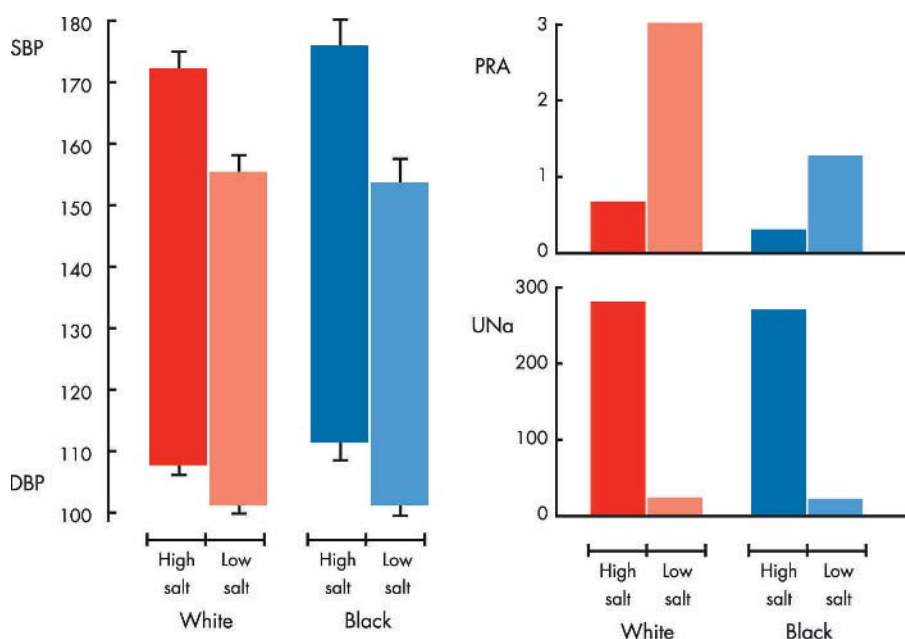
#### Treatment with antihypertensive drugs

South Asians appear to respond to antihypertensive drug treatment in a similar manner to whites.<sup>2</sup> However, there is insufficient information on this point and South Asians are

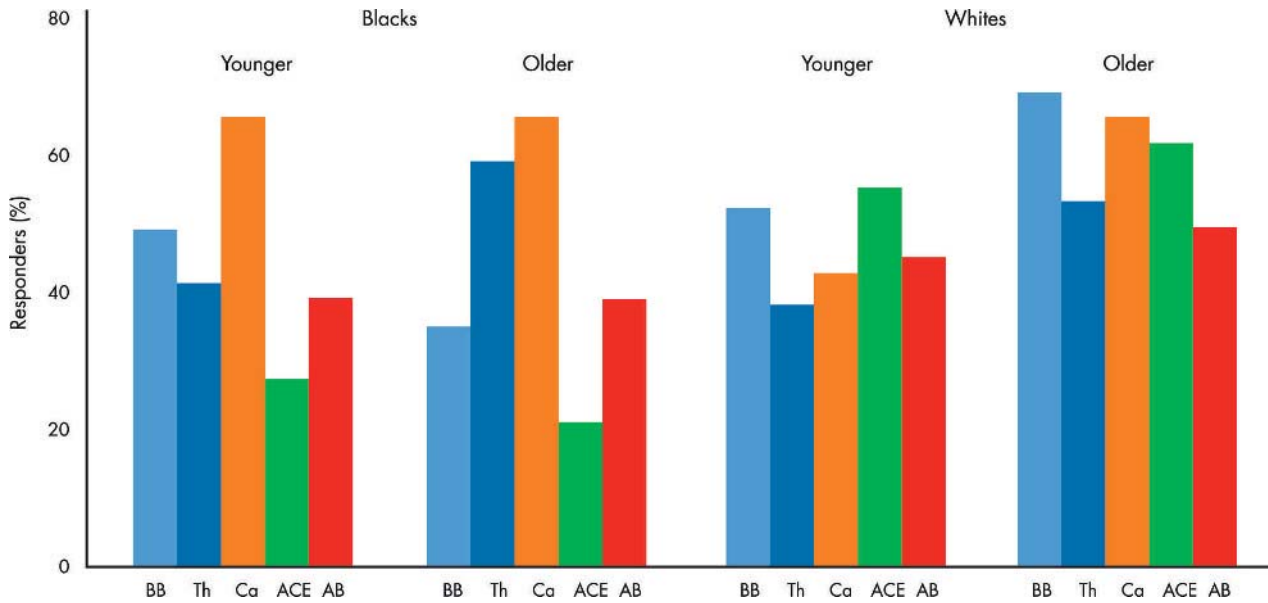
under-represented in studies. The excellent blood pressure lowering efficacy of diuretics and calcium channel antagonists in hypertensive black patients is related to their characteristic volume expansion, salt sensitivity and low renin profile (figs 3–5). Diuretics should be used for initial treatment unless there is an absolute or relative contraindication (for example, gout). Randomised controlled trials have shown that diuretics reduce hypertension related morbidity and mortality in black as well as in white populations, but there is evidence of a greater decrease in blood pressure among hypertensive black patients when compared to white patients when they receive an equivalent dose of a diuretic.<sup>19</sup> Hydrochlorothiazide in a dosage of 12.5–25.0 mg daily is a good choice but, if the concentration of serum creatinine is 2 mg/dl (177  $\mu$ mol/l) or more, thiazide diuretics are usually ineffective, and a loop-type diuretic should be substituted.<sup>20</sup> Calcium channel blockers are also extremely effective antihypertensive drugs in black patients.<sup>21</sup>

Angiotensin converting enzyme (ACE) inhibitors,  $\beta$  blockers, and angiotensin receptor antagonists are generally less effective as monotherapy in black hypertensives,<sup>22–23</sup> because of the tendency towards a low renin state and a lower cardiac output, with increased peripheral resistance. For example, with  $\beta$  blocker treatment, there was an average reduction in blood pressure of about 7/7 mm Hg in black patients compared with an average reduction of about 15/11 mm Hg in white patients.<sup>24</sup> Increasing the dosage of the ACE inhibitor provides a slightly greater average lowering of blood pressure (to a total of about 10/8 mm Hg), but the decrease is still less than desirable.<sup>25</sup> Ensuring a low dietary salt intake can improve the blood pressure response to ACE inhibitors in black patients.<sup>26</sup>

The effectiveness of  $\beta$  blockers and ACE inhibitors, in lowering blood pressure, can be increased if diuretics are used as initial or second line drug treatment in black patients with hypertension. The combination of diuretics and ACE inhibitors or  $\beta$  blockers produces equivalent lowering of blood pressure in whites and blacks, perhaps as a result of diuretic induced stimulation of renin release. This is true even for



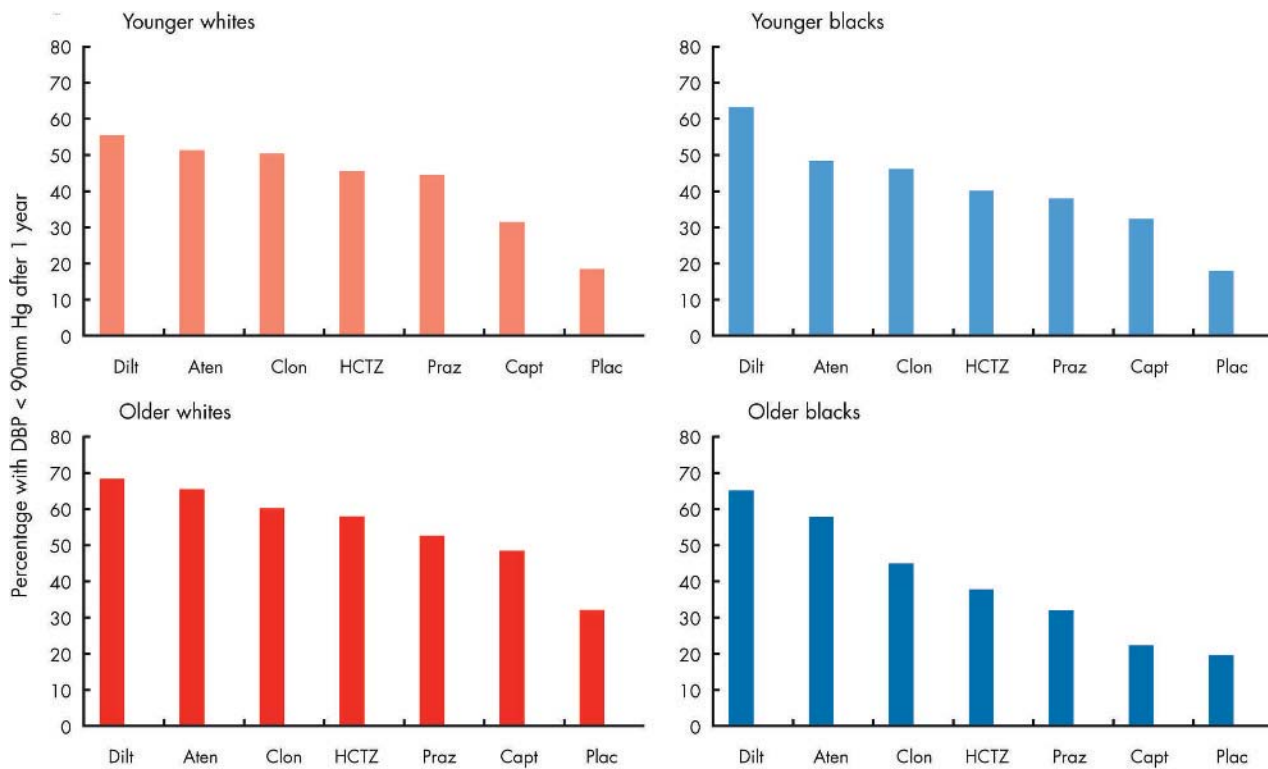
**Figure 2** Effect of salt restriction on blood pressure in Europeans and Afro-Caribbeans. PRA, plasma renin activity (ng/ml/hour); DBP, 24 hour diastolic blood pressure (mm Hg); SBP, 24 hour systolic blood pressure; UNa, urinary sodium excretion (mmol/day). Adapted from He *et al.*<sup>18</sup>



**Figure 3** Response of whites and blacks to differing antihypertensive medication: Veterans Administration study. AB,  $\alpha$  receptor blockers; ACE, angiotensin converting enzyme inhibitors; BB,  $\beta$  blockers; Ca, calcium channel blockers, Th, thiazide diuretics. Adapted from Materson, *et al.*<sup>21</sup>

combination-type drugs that contain as little as 6.25–12.5 mg of hydrochlorothiazide.<sup>27</sup> Most hypertensive black patients require two or more antihypertensive drugs to control systolic blood pressure to < 140 mm Hg and diastolic blood pressure to < 90 mm Hg. In the Veterans Affairs cooperative study,<sup>28</sup> only 46% of black hypertensive patients with stage 1 or stage 2 disease achieved a diastolic blood pressure below 90 mm Hg with monotherapy.

However, in situations where a  $\beta$  blocker or an ACE inhibitor is indicated, the use of high doses and/or the addition of a diuretic improves the blood pressure response in black populations. Examples include the use of  $\beta$  blockers after myocardial infarction and the use of ACE inhibitors in patients with systolic heart failure (that is, ejection fraction < 40%) or those with type 1 diabetes (formerly known as insulin dependent diabetes) with proteinuria. These



**Figure 4** Effect of age and ethnicity on response to antihypertensive medication. Aten, atenolol; Capt, captopril; Clon, clonidine; Dilt, diltiazem; HCTZ, hydrochlorothiazide; Plac, placebo; Praz, prazosin. Adapted from Materson *et al.*<sup>21</sup>

compelling indications apply equally to black and white patients. In these cases, the protective effect of the drugs is due to more than just reduction of blood pressure. In black hypertensive patients with type 2 (non-insulin dependent) diabetic nephropathy, evidence now shows that non-dihydropyridine calcium channel antagonists (as well as ACE inhibitors) can slow the chronic progression of renal disease.<sup>29</sup> However, there is evidence of significant under use of these drugs for these conditions in both racial groups.<sup>22</sup>

There is limited information to date about the efficacy and tolerability of angiotensin receptor antagonists in black patients. One subgroup analysis of patients treated with valsartan suggests that it may reduce mean blood pressure, but the mean reduction is less than that seen for other ethnic groups.<sup>30</sup>

### ALLHAT

With the inclusion of over 42 000 patients, ALLHAT (anti-hypertensive and lipid-lowering treatment to prevent heart attack trial)<sup>32</sup> is the largest randomised controlled trial of antihypertensive treatment to date. Patients aged 55 years and older, with hypertension and at least one other risk factor for coronary heart disease (CHD)—for example, type 2 diabetes mellitus, previous myocardial infarction or stroke, left ventricular hypertrophy or smoking—were included in the study. They were randomised to either chlorthalidone, amlodipine, lisinopril, or doxazosin and assessed on the basis of morbidity and mortality from coronary artery disease.

The study included 35% (15 094 patients) black patients. The black patients were younger, had higher diastolic blood pressure levels, higher mean fasting glucose values, and greater incidence of diabetes at baseline.<sup>27</sup> There were no significant difference in primary outcomes of non-fatal myocardial infarction or fatal CHD between chlorthalidone, amlodipine, and lisinopril in the black patients. In addition, in terms of secondary end points—namely, all cause mortality, stroke, combined CHD, and cardiovascular disease—there were no significant differences between

### Management of hypertension in patients from ethnic minorities: key points

- ▶ In a western adult population the prevalence of hypertension exceeds 20%
- ▶ Hypertension is a major risk factor for cardiovascular and cerebrovascular disease
- ▶ The pathophysiology of hypertension differs in black adults compared to South Asians and whites
- ▶ South Asians appear to respond to antihypertensive drug treatment in a similar manner to whites
- ▶ There is excellent blood pressure lowering efficacy of diuretics and calcium channel antagonists in hypertensive black patients
- ▶ ACE inhibitors,  $\beta$  blockers, and angiotensin receptor antagonists are generally less effective as monotherapy in black hypertensives

chlorthalidone and amlodipine. In comparison to lisinopril, chlorthalidone treatment was associated with a lower risk of stroke, combined coronary artery disease, and combined cardiovascular death. The differences may be explained, in part, by the lesser blood pressure lowering effects of angiotensin converting enzyme inhibitors in black Americans. In terms of combined cardiovascular death, chlorthalidone was favourable compared to doxazosin. There was a reduced relative risk of heart failure with chlorthalidone compared to amlodipine, lisinopril, and doxazosin.

### CONCLUSION

Hypertension is associated with significant morbidity and mortality, some of which can be reduced with effective blood pressure lowering. The prevalence of hypertension is greater in ethnic minority groups, compared to whites, within the UK. The management of hypertensives from ethnic minorities should recognise their different responses to drug

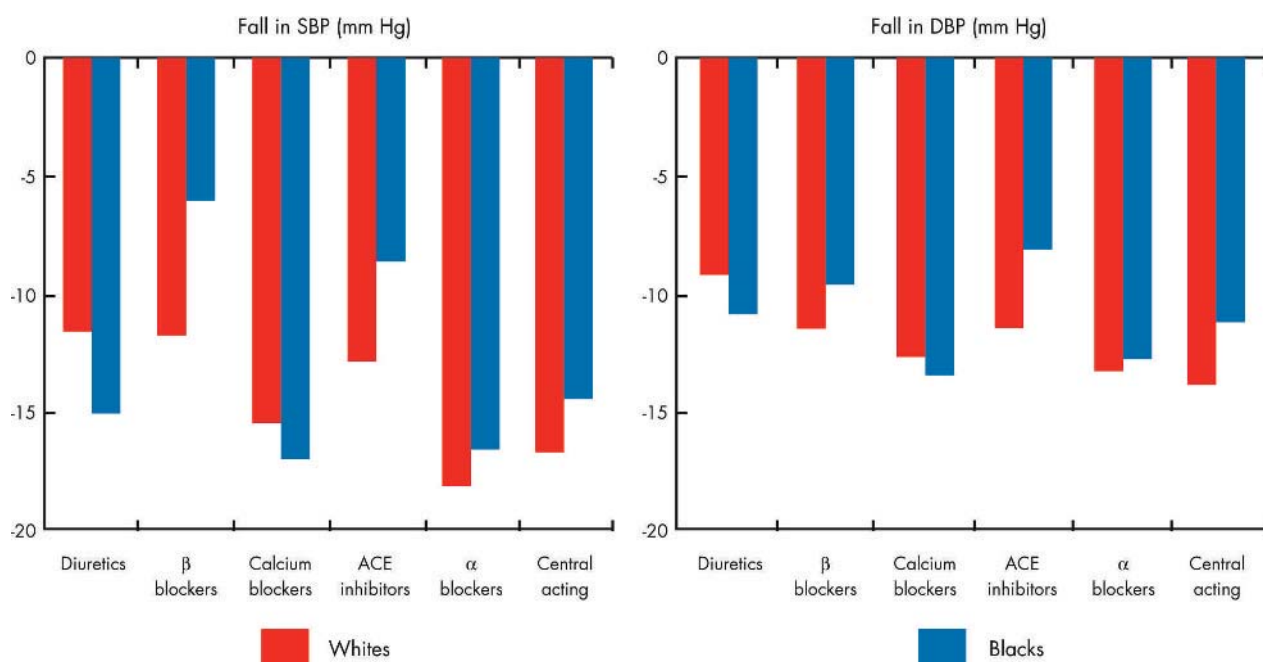


Figure 5 Meta-analysis of monotherapy in black and white hypertensives. Adapted from Sehgal.<sup>31</sup>

treatment, the predisposing factors, and the cardiovascular consequences of hypertension.

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In compliance with EBAC/EACCME guidelines, all authors participating in Education in Heart have disclosed potential conflicts of interest that might cause a bias in the article

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