A survey of hypertensive practices at two community health centres in Cape Town

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Background. Control of hypertension remains an elusive goal, but doctors' non-compliance with guidelines, patient attitudes and adherence to treatment, and poor delivery of care at clinics are important contributing factors.

Objectives. To determine the overall quality of hypertensive care, and compliance with current hypertension guidelines at community health centres (CHCs) in the Western Cape.

Methods. Consecutive patients attending hypertension clinics at two CHCs were selected to participate. A questionnaire was designed to determine patient demographics, doctors' compliance with hypertension guidelines, factors leading to treatment non-adherence, and delivery of care. Accuracy of blood pressure (BP) recording was evaluated by comparing the clinic BP with that measured using an approved manometer.

Results. One hundred and sixty-one patients were evaluated, 100 from CHC 1 and 61 from CHC 2. There was no difference in both control systolic and diastolic BP measured by the hypertension nurse (147.9 v. 144.8 mmHg, $p = 0.45$, and 89.3 v. 85.6 mmHg, $p = 0.14$) respectively. All clinic BP readings were recorded to the nearest 10 mmHg mercury. The difference in both systolic and diastolic BP > 10 mmHg between the clinic and control BP was significantly greater at CHC 2 than CHC 1 (28% v. 56%, $p = 0.005$, and 43% v. 64%, $p = 0.007$) respectively. Overall, 39.8% of patients had a systolic and diastolic BP < 140 and < 90 mmHg. The mean number of antihypertensive drugs was 2.4 per patient. The use of non-steroidal anti-inflammatory drugs (NSAIDs) and tricyclic antidepressants was high at both centres, and few patients underwent basic investigations, lifestyle interventions, risk stratification or global cardiovascular risk reduction.

Conclusions. 39.8% of patients achieved a BP < 140/90 mmHg. There is significant scope for improvement in prescription of medication, application of uniform lifestyle changes, and avoidance of NSAIDs and tricyclic antidepressants. Major deficiencies were identified in BP measurement, assessment of target organ damage, risk stratification and the reduction of overall cardiovascular risk.

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A recent major global publication[1] has suggested that there is a hidden and burgeoning epidemic of cardiovascular disease in developing countries. In South Africa a cluster of diseases, namely stroke, ischaemic heart disease and hypertensive heart disease, account for 4 of the top 10 causes of death, and cardiovascular disease accounts for 17% of all deaths.[2] In developed countries the prevalence of chronic kidney disease has shown exponential growth, mainly because of type 2 diabetes and hypertension.[3,4] In South Africa hypertension is the dominant risk factor for stroke, coronary heart disease, heart failure and chronic kidney disease.[1,2]

Control of hypertension remains an elusive goal. The reasons for this are complex, but doctors' non-compliance with guidelines, patient attitudes and compliance, and poor delivery of care at community health centres (CHCs) are important factors contributing to poor blood pressure (BP) control. In a previous survey done by Steyn *et al.*[5] in a CHC in the Western Cape, 42.1% of patients had a BP below 140/90 mmHg, patients had little knowledge of their disease, and 15.5% reported that insufficient medication was provided when filling prescriptions.

Objectives

The objective of the survey was to determine the overall quality of hypertensive care and compliance with current hypertension guidelines in two CHCs in the Western Cape.

Methods

Two large CHCs predominantly serving black (CHC 1) and coloured (CHC 2) patients were selected to participate in the survey. A patient questionnaire was designed to determine patient demographics, doctors' compliance with hypertension guidelines, factors leading to treatment non-adherence, and delivery of care. Accuracy of BP reading was evaluated by comparing the clinic BP against that measured using an approved manometer supervised by a registered nurse trained in BP measurement (control BP). Consecutive patients attending hypertension clinics at the two CHCs were approached to participate in the survey. After giving informed consent the patients completed a questionnaire; information was verified from the patient notes wherever possible. Weight,

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waist circumference, height, and control BP were measured, and body mass index (BMI) was calculated. The study was approved by the Western Cape Department of Health and the University of Cape Town Research Ethics Committee.

Normally distributed data were analysed using the Student's *t*-test, and non-parametric data were analysed using either Fisher's exact test or the chi-square test.

Results

One hundred and sixty-one patients were evaluated, 100 from CHC 1 and 61 from CHC 2. The patient demographics are shown in Table I. The mean age of the patients was 59 years, and 62.1% were female. At both centres the majority of patients were pensioners, on disability grants, or unemployed (80.1% in total), but this was more marked at CHC 2. Only the minority of patients were employed or studying (19.7%).

Smoking, alcohol intake and levels of education were similar between the centres. The mean BMI was significantly higher at CHC 2 than at CHC 1 (33.2 v. 30.7 kg/m^2, $p < 0.05$) but waist circumferences were similar (100.6 v. 100.7 cm, $p = 0.96$). Overall, 41.9% of men and 85.1% of women had a waist circumference above the recommended levels of 102 cm and 88 cm respectively, and 45.3% of all patients had a BMI greater than 30 kg/m^2.

Both systolic and diastolic BP measured by the clinic staff were significantly higher at CHC 1 than at CHC 2 (152.9 v. 144.6 mmHg, $p = 0.03$, and 94.2 v. 89.6 mmHg, $p = 0.04$) respectively. At both centres all clinic BPs were measured to the nearest 10 mmHg. There was no difference in both control systolic and diastolic BP measured by the hypertension nurse (147.9 v. 144.8 mmHg, $p = 0.45$, and 89.3 v. 85.6 mmHg, $p = 0.14$) respectively. The difference in both systolic and diastolic BP > 10 mmHg between the clinic and control BP was significantly greater at CHC 2 than CHC 1 (28% v. 56%, $p = 0.005$, and 43% v. 64%, $p = 0.007$) respectively. Overall, 39.8% of patients had both a systolic and diastolic BP < 140 and < 90 mmHg respectively.

Underlying associated diseases and complications of hypertension are shown in Table III. There was a significantly higher prevalence of ischaemic heart disease at CHC 2 than at CHC 1 (21 v. 6%, $p = 0.003$).

The drug treatment of patients is shown in Table IV. The mean number of antihypertensive drugs was 2.4 per patient.

Table I. Patient demographics

Parameter	CHC 1 (SD) ($N = 100$)	CHC 2 (SD) ($N = 61$)	Overall (SD)	*p*-value
Age (years)	57.9 (12.7)	60.8 (7.9)	59 (11.2)	0.1
Males (%)	39	36	37.9	-
Education* (years)	7.6 (2.8)	7.2 (2.7)	7.5 (2.8)	0.32
Any alcohol use (%)	13	10.9	11.8	0.37
Smokers (%)	10	15.1	8.7	0.1
Length of hypertension (years)	7.9 (7.1)	10.8 (9.7)	9 (8.3)	0.03
Weight (kg)	79 (16.3)	80.9 (18.4)	79.7 (17.1)	0.48
Waist circumference (cm)	100.6 (12.5)	100.7 (22.1)	100.6 (16.7)	0.96
Body mass index (kg/m^2)	30.7 (7.3)	33.2 (14.2)	31.2 (10.2)	0.05
Employment status (%)				
Pensioner	37	55.7	44.7	0.02
Disability grant	5	13.1	8.1	0.06
Unemployed	33	19.7	28	0.07
Employed	23	11.5	18	0.03
Student	2	0	1.2	0.38

*Number of years in formal education.
SD = standard deviation.

Table II. Mean clinic and control BP, and differences between clinic and control BP

	CHC 1 (SD)	CHC 2 (SD)	Overall (SD)	*p*-value
Clinic systolic BP (mmHg)	152.9 (24.64)	144.6 (20)	149.7 (23.2)	0.05
Clinic diastolic BP (mmHg)	94.2 (13.9)	89.6 (12.9)	92.4 (13.7)	0.03
Control systolic BP (mmHg)	147.9 (30.1)	144.8 (22.7)	146.7 (27.6)	0.45
Control diastolic BP (mmHg)	89.3 (30.1)	85.6 (12.9)	87.9 (15.7)	0.14
> 10 mmHg difference in systolic BP* (%)	28	56	38.5	0.005
> 10 mmHg difference in diastolic BP* (%)	43	64	50.9	0.007

*Refers to the percentage of patients with more than 10 mmHg difference between the clinic and control BP.

The median dose (range) of enalapril was 15 mg (5 - 20 mg), hydrochlorothiazide 12.5 mg (12.5 - 25 mg), and atenolol 100 mg (25 - 100 mg). All patients receiving nifedipine GITS were prescribed 30 mg. Significant difference in use of antihypertensive drugs was revealed between the two centres. At CHC 1 patients were more likely to receive a thiazide diuretic (88% v. 70.5%, $p < 0.006$), and less likely to receive a beta blocker (38% v. 57.4%, $p = 0.02$) and a calcium channel blocker (CCB) (6% v. 26.2%, $p = 0.004$). The use of non-steroidal anti-inflammatory drugs (NSAIDs), tricyclic antidepressants and paracetamol was high at both centres. Patients at CHC 2 were more likely to receive NSAIDs (42.6% v. 25%, $p = 0.02$) than paracetamol (24.6% v. 63%, $p = 0.0001$). Of the patients receiving NSAIDs, 31.9% received ibuprofen, 23.4% indomethacin, and 44.7% diclofenac. The overall use of statin therapy was very low (2.5%), and low-dose aspirin was more likely to be used at CHC 2 (47.5% v. 14%, $p = 0.0001$).

The performance of routine investigations at both centres is shown in Table V. There was a highly significant trend for more extensive investigation at CHC 2 than CHC 1 with the exception of urinalysis and serum creatinine.

Overall, 61.7% of patients self-reported no missed doses of medication and 37.4% admitted missing more than 1 dose of medication per week. There was no difference between the centres. Fifty-six per cent of patients at CHC 1 reported that their prescription was not properly filled at the pharmacy in the last year, which was significantly more than at CHC 2 (21.3%, $p = 0.03$).

At CHC 2 56% of patients reported receiving advice on lifestyle management of their hypertension, which was significantly higher than at CHC 1 (38%, $p = 0.03$).

Table III. Underlying co-morbid diseases

Co-morbidity	CHC 1 (%)	CHC 2 (%)	Overall (%)	*p*-value
Cerebrovascular accident	15	15	15	0.98
Ischaemic heart disease	6	21	11.8	0.003
Cardiac failure	8	9	8.1	0.59
Chronic kidney disease	0	1.6	0.6	0.38
Diabetes	8	14.8	10.6	0.4
Asthma	5	11	6.8	0.19
Arthritis	43	47.5	44.7	0.57

Table IV. Percentage of patients treated with each major class of antihypertensive, and other concomitant medication

Medication	CHC 1 (%)	CHC 2 (%)	Overall (%)	*p*-value
Antihypertensives				
Thiazide diuretics	88	70.5	81.4	< 0.006
ACE inhibitor	61	70.5	64.6	0.22
β-blocker	38	57.4	45.3	0.02
Calcium channel blocker	6	26.2	13.7	0.004
Hydralazine	20	11.5	16.8	0.11
Concomitant medication				
Aspirin	14	47.5	26.7	0.0001
Simvastatin	2	3.4	2.5	0.49
NSAIDs	25	42.6	31.7	0.02
Paracetamol	63	24.6	48.4	0.0001
Tricyclic antidepressants	26	19.7	29.8	0.36

ACE = angiotensin-converting enzyme; NSAIDs = non-steroidal anti-inflammatory drugs.

Table V. Routine investigations performed

Investigation	CHC 1 (%)	CHC 2 (%)	Overall (%)	*p*-value
Urine dipsticks	44	59	49.7	0.06
Creatinine	17	19.7	18	0.67
ECG	0	27.9	10.6	0.0001
Cholesterol	2	21.3	9.3	0.0001
Glucose	45	70.5	54.7	0.002

ECG = electrocardiogram.

Discussion

This survey has important implications for the delivery of hypertensive care to largely indigent patients in the Western Cape. It identifies important deficiencies in administration, BP measurement, and compliance with current hypertension guidelines. Furthermore it highlights important differences in the standard of care within two facilities in close proximity and within the same health administration.

The majority of patients attending the CHCs are the unemployed, pensioners, and those on disability grants. Employed persons and students made up only 19% of those surveyed. All patients need to visit the facility monthly, and waiting times to see health care personnel and receive medication are very long. This appears to be a major disincentive to employed people to attend CHCs, and administrative processes within these centres need to be rationalised to reduce waiting times. Additionally there is no obvious reason why compliant patients with well-controlled BP should not be seen 6-monthly, and receive 3 months' supply of medication. Public/private partnerships could also be explored.

Another important administrative problem was in the delivery of medication to patients. Fifty-six per cent and 26.1% of patients at CHCs 1 and 2 respectively reported that their scripts for medication were incompletely filled in the last year. This is far higher than reported by Steyn *et al*.[5] in the previous survey. This certainly will result in increased inconvenience and may lead to poorer BP control. The reason for the failure to fill prescriptions was not documented, but it was probably because of inadequate supplies in the dispensary.

Serious shortcomings in BP measurement were another major finding of the survey. In all 161 cases BP was measured to the nearest zero, indicating uniform digital bias. This implies that BP is only measured to the nearest 10 mmHg, which has important implications for assessing control and classifying the severity of hypertension. Discrepancies in the BP measured in the clinic and control BP were common. For example, 50.9% and 38.5% of patients had a difference of more than 10 mmHg in diastolic BP and systolic BP respectively. In part, these differences may have been due to the reduction in white coat effect between the clinic and control BP, but in many cases the control BP was higher than the clinic BP and in some cases the difference was > 50 mmHg. In addition, this phenomomen was more prevalent at CHC 2, suggesting that BP measurement was less well performed at this centre, and the significant differences in mean systolic and diastolic BP between the two centres disappeared once the mean control systolic and diastolic BP was used.

Regarding the standard of care of hypertensive patients, there were positive aspects to BP control. Overall, 39.8% of patients had both a systolic and diastolic BP < 140 and < 90 mmHg, which is comparable to that reported from other centres in the Western Cape. In 1999 Steyn *et al*.[5] reported that 42.1% of hypertensives attending CHCs had BP < 140/90 mmHg, and more recently in a survey[6] of black hypertensives from peri-urban township areas 33% of men and 44% of women had BP < 140/90 mmHg. The control rates were not as good as those published by the US National Health and Nutrition Examination Survey[7] where 53.1% of treated hypertensives had BP < 140/90 mmHg. In a survey[8] of hospital outpatient services in Gauteng only 24.5% of patients had their BP controlled.

With the exception of angiotensin receptor blockers all major classes of antihypertensive drugs were available for use by health professionals with few restrictions. Thiazide diuretics were widely prescribed particularly at CHC 1 in accordance with most guidelines. Angiotensin-converting enzyme (ACE) inhibitors were the second most popular drug. Beta-blockers were more widely used at CHC 2 than at CHC 1, possibly because of the higher prevalence of ischaemic heart disease at CHC 2 and the reported lesser efficacy of these agents in black patients. CCBs were underutilised at both centres, particularly at CHC 1. This is an important finding as CCBs are considered very effective for treatment of hypertension in black patients,[9] but this may be related to policies of the CHCs where CCBs are considered fourth-line therapy because of higher cost of these drugs. The monthly cost of amlodipine (the current preferred dihydropyridine CCB for the Western Cape) in the public sector is R19.14 for 5 mg compared with R0.74 for hydrochlorothiazide 12.5 mg daily, R2.36 for atenolol 50 mg daily and R2.59 for enalapril 5 mg twice daily.

The use of tricyclic antidepressants (23.6%) and NSAIDs (31.7%) in this survey was high despite the known adverse effects of these agents on BP, and the potential cardiotoxicity of tricyclics. The high use of NSAIDs was probably related to the high prevalence of arthritis among the patients. However at CHC 1 significantly more patients received paracetamol than NSAIDs for analgesia, which again demonstrates the important differences in clinical practice between the centres.

The most serious shortcomings in hypertensive care were the inadequate assessment of target organ damage, and failure to conduct any form of risk stratification and global cardiovascular risk management. Firstly, and not unexpectedly, obesity was highly prevalent. Overall, 45.3% of all patients were obese with a BMI greater than 30 kg/m^2, and 41.9% of men and 85.1% of women had a waist circumference above the recommended levels of 102 cm and 88 cm respectively. Yet only 56% of patients reported ever being counselled on improving BP and reducing cardiovascular risk through lifestyle measures. As a fasting lipogram and fasting glucose test were seldom performed, we were unable to determine the prevalence of the metabolic syndrome, but 41.9% of men and 85.1% of women fulfilled at least two criteria, namely BP and waist circumference.

Secondly, there was no attempt made to undertake risk stratification through the performance of a few basic investigations. Urinalysis was only performed in 49.7% of patients. This was particularly serious at CHC 2, where for example none of the 100 patients had an electrocardiogram (ECG) performed. All the investigations shown in Table V are mandatory for the proper assessment of a hypertensive patient.[10] For example, unless a fasting glucose is done routinely, the diagnosis of diabetes or impaired fasting glucose will be overlooked. The ECG is an important tool for assessing left ventricular hypertrophy. Renal disease can be silent, and unless routine dipsticks and serum creatinine are performed, occult renal disease will be missed. In a recent survey of hypertensive patients in the Cape Peninsula,[6] silent renal disease was present in 25% of men and 6% of women, and 35% of patients had ECG left ventricular hypertrophy assessed using the Sokolow-Lyon criteria. Recognition of target organ damage in the early phases of development plays a crucial role in risk stratification, choice of antihypertensive therapy and intensity of treatment.

Thirdly, the use of statin therapy in this population was extremely low. Recent data from the ASCOT Lipid-Lowering Arm Trial[11] strongly suggests that statin therapy benefits patients with hypertension almost regardless of initial cholesterol levels. However, in the Western Cape at the time of the survey statin therapy was restricted to patients with familial hypercholesterolaemia and patients with established ischaemic heart disease. Nonetheless statins were only used in 2.5% of patients whereas the prevalence of ischaemic heart disease in the survey was 11%, suggesting that the restrictive formulary policies were not the sole reason for their underutilisation.

The use of aspirin is not well established in hypertensive patients. The current hypertension guidelines[10] recommend its use in high-risk patients provided that BP is well controlled. Aspirin was used more often at CHC 2, probably because of the higher prevalence of ischaemic heart disease.

Certain weaknesses of the study may have influenced results. Firstly, this was a cross-sectional study, and BP control was not assessed over time. Furthermore the patients entering the study may have been more motivated and/or had more time to spend at the clinic, and may therefore have influenced the reported level of BP control and the demographics of the patients participating.

In conclusion, this survey found that BP control at the two CHCs was reasonable compared with other data reported from the Western Cape, but not as good as data from the USA. There is scope for improvement as many patients were receiving two or less antihypertensive drugs and lifestyle measures were not uniformly applied. Additionally, many patients were receiving NSAIDs and tricyclic antidepressants that may have worsened BP control. There were important administrative deficiencies in the delivery of drugs to patients, and long waiting times associated with the unemployed, pensioners and those on disability grants. There is a large number of employed South Africans in low-income groups who do not have medical insurance and rely on the public sector for their health care. Major deficiencies were identified in BP measurement, assessment of target organ damage, risk stratification and the reduction of overall cardiovascular risk.

Based on the findings of this survey we recommend the following:

1. The health authority needs to familiarise all primary care health professionals with the new Hypertension Guidelines[10] formulated by the National Department of Health and the South African Hypertension Society, and ensure appropriate implementation. Particular attention needs to be paid to the importance of measuring BP accurately, implementing lifestyle changes, assessing target organ damage with basic investigations, risk stratification and global cardiovascular risk reduction.

2. Administrative changes need to be made to drastically reduce waiting times and ensure smooth supply of medication and availability of basic investigations

3. All staff should undergo basic BP training, and reliable and durable automated BP manometers should be used in clinics.

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