Hypertension care at a Cape Town community health centre

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Objectives. To describe the demographic profile of hypertensive patients and the quality of care for hypertension at a Cape Town community health centre (CHC).

Design. Prospective, descriptive study.

Setting and subjects. Medium-sized CHC, attended by 1 098 hypertensive patients during a 1-year period from 1 January 1992.

Outcome measures. Default rate — proportion of due visits not attended. Loss to follow-up — proportion of patients persistently defaulting or not responding to recall. Frequency of blood pressure measurement — per 12 due visits. Compliance — proportion of patients collecting ≥ 75% of antihypertensive drugs. Blood pressure control — mean blood pressure of aggregated readings; and proportion controlled (< 160/95 mmHg) on the basis of all blood pressure readings and mean blood pressures of individual patients with two or more readings during the study period.

Results. More than half (51.6%) of the hypertensive patients were aged ≥ 65 years; 81.7% were female. The default rate was between 11.9% and 19.4%. Compliance was high (76.9%). Loss to follow-up was 8.1%. Blood pressure was recorded a mean of 4.0 times per 12 due visits. There were no significant gender differences with regard to these measures. Mean blood pressure was 158.3/89.6 mmHg. Over half (56.7%) of all individual readings over the year were uncontrolled and 51.4% of patients were found to be uncontrolled when categorised by their mean blood pressure. Control was significantly poorer among women ≥ 65 years.

Conclusion. We found better compliance, more frequent blood pressure measurement, and lower defaulting and loss to follow-up compared with previous South African studies in similar settings. Despite this, blood pressure control was mediocre. Possible explanations for this are discussed. The low proportion of male hypertensives attending the CHC suggests that the accessibility or acceptability of care is poor for this group. The study illustrates the potential for research in this setting and for the use of computers to monitor the quality of primary care.

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Hypertension is a major public health issue in South Africa, and has been specifically mentioned in the Reconstruction and Development Programme. There is overwhelming evidence that untreated or uncontrolled hypertension is a major risk factor for stroke, renal failure, coronary heart disease and heart failure, and causes a large burden of preventable ill health and premature death.[1] There is compelling evidence that effective treatment of hypertension reduces the occurrence of adverse outcomes and subsequent mortality, particularly from stroke.[2]

Community-based surveys have revealed age-adjusted prevalences of hypertension of 15 - 34%, and show that hypertension is common throughout South Africa in all ethnic groups, except perhaps blacks with traditional lifestyles in rural areas.[3,4] Hypertension is a particular problem among the coloured population of the Cape Peninsula. Community-based surveys have found an age-adjusted prevalence of 18% in 15 - 64-year-olds[5] and prevalences of 72% and 82% in adults over 65 years.[6,7]

Most patients with hypertension are treated in primary care settings. Studies have repeatedly shown that hypertensives are poorly detected, and that even those who are detected are often treated inadequately or not at all.[8-11] A 'rule of halves' has been proposed as a typical description of treatment for hypertension in a population.[12] This states that half of all hypertensive patients are not known to health services, half of those who are known are not treated, and half of those treated are treated inadequately (with the result that only approximately one-eighth of hypertensives are well-controlled).

Evidence from community surveys and from patients attending health care facilities has shown that this rule also applies in South Africa,[13,14] including the mainly coloured communities of the Cape Peninsula. For example, the 1982 Coronary Heart Disease Risk Factor Study (the CRISIC study),[5] revealed that only 41% of hypertensives were being treated. Of these only 25% were adequately controlled, so that only 16% of all hypertensives were on treatment and controlled. There have been similar findings among stevedores from Cape Town,[15] members of the Mamre community[16] and among elderly coloureds.[7]

Control of hypertension in patients attending health care facilities has also been shown to be poor. For example, of 1 046 mainly coloured patients attending eight private general practices in the Cape Flats area and screened for hypertension, only half of those with high blood pressure (BP) were on treatment and only 18% had their BP controlled.[17] Another study from a Cape Flats day hospital in 1985 found that 13% of hypertensive patients from a coloured community had their diastolic BP controlled.[18]

Possible reasons for poor BP control among treated hypertensives in South Africa include poor attendance at clinics and lack of compliance with treatment. A study in a Sowetan polyclinic in 1979 found that 31% of newly diagnosed hypertensives failed to attend clinic again after the initial visit and only a quarter attended sufficiently over the next year to collect 80% or more of their prescribed treatment.[19] There have been similar findings from other settings.[20]

There are some important limitations to previous work in South Africa. Firstly, all except one study[18] assessed BP control on the basis of a single measurement. This has limited clinical relevance as treatment decisions are rarely based on a single reading. It may also give an unduly pessimistic view of hypertension control. Secondly, evaluation of attendance and compliance has usually been for newly diagnosed patients, rather than known hypertensives, and has been based on retrospective assessment. Attendance has often only been assessed from loss to follow-up over a defined time period. Finally, existing studies are now rather dated and describe the quality of care up to 1985 at the latest.

The need for a more up-to-date and in-depth study of the quality of care for chronic conditions like hypertension in primary care is underlined by the current emphasis on restructuring of health services around the primary care approach and development of programmes for the cost-effective management of chronic diseases in primary care.[21]

This study is a descriptive, prospective study of new and existing hypertensive patients attending a Cape Flats community health centre (CHC) in 1992. (CHCs were formerly known as day hospitals.)

The main objectives were: (*i*) to describe the demographic profile of patients attending the CHC; (*ii*) to evaluate quality of care using process (rate of defaulting, loss to follow-up, frequency of BP measurement and compliance with collection of drugs) and outcome (mean BP, and proportion of readings and patients with controlled BPs) indicators; and (*iii*) to compare quality of care in age and sex subgroups.

A second study performed simultaneously to assess the effectiveness of measures to promote more cost-effective prescribing will be reported separately.[22]

Methods

Study design. This was a prospective, descriptive study.

Setting. The study was performed at the Dr Abdurahman CHC in Athlone in the Cape Flats area of Cape Town. It is a medium-sized CHC with the usual complement of four full-time doctors and four clinical nurse practitioners. About 70 000 patients are seen each year. Most of the population served by the CHC is coloured. Many are underprivileged, and poor and overcrowded housing and unemployment are extremely common.

Patients with hypertension were seen approximately every 8 weeks (unless more frequent monitoring was clinically indicated). Appointments alternated between the doctor and the nurse practitioner (unless the nurse referred a patient to the doctor for a management problem). BPs were routinely recorded at these visits and the patients prescribed 4 weeks' supply of antihypertensive medications. Between visits, patients (or their representatives) were asked to collect repeat prescriptions from the hospital pharmacy. This occurred approximately 4 weeks after the clinic appointment, and clinical staff were not seen (and BP not recorded) unless the patient had made a special appointment.

Subjects. Hypertensive patients were identified during consultation, from case notes, or from examination of pharmacy charts. Hypertensive patients were defined as those receiving antihypertensive drugs during the study period and whose notes had a diagnosis of hypertension or clearly elevated BPs recorded.

A total of 3 147 hypertensive patients attended during the study period. The first 1 098 patients entered on the database were selected for more detailed data collection.

Data collection. Data were collected for the first 12 visits (or due visits) of known hypertensive patients after 1 January 1992. Visits were not always at exact 4-week intervals and for a few patients the 12 visits extended into early 1993. Some patients were newly diagnosed with hypertension during 1992. For these patients data were collected for the number of visits left after exclusion of those that would have occurred in the period prior to diagnosis (for example, for a patient diagnosed in April, data were collected for their initial visit and the next eight visits or due visits).

The first author entered data for the selected patients onto an Epi-Info database, either during consultations or by extracting data retrospectively from clinical notes and prescription records.

Demographic data were recorded for all hypertensive patients. The following information was recorded for the selected patients: outcome of each due visit, BP (if recorded), antihypertensive drugs prescribed and collected, and cost of drugs.

Possible outcomes for due visits were categorised as follows: (*i*) BP recorded and drugs collected; (*ii*) collection of drugs only; (*iii*) definite default; (*iv*) possible default (these were defined as visits where no medication was collected or BP recorded and the patient was either entered as 'lost to follow-up' or 'moved away,' or no entry was made); (*v*) patient transferred out of CHC's care (to secondary or tertiary centre, or residential nursing home); and (*vi*) patient deceased.

Blood pressure was recorded by the nurse practitioner or doctor. The nurse practitioners were trained in blood pressure measurement and received regular in-service training courses. Two readings were taken from seated patients. A mercury sphygmomanometer with appropriate cuff size (42 cm cuff for obese patients) was used with the mercury barometer positioned vertically at the same level as the heart. In 1991 all staff were reminded of correct measurement techniques and provided with the recommendations of the Southern African Hypertension Society symposium.[23]

Analysis. Representativeness of the sample was checked by comparing the age and sex distribution with that of all attenders who had been prescribed hypertensive medications during 1992.

Two default rates were calculated. The 'minimum default rate' was definite defaults per due visit. The 'maximum default rate' was definite defaults plus possible defaults per due visit.

The denominators for calculating rates for defaulting and measurement of BP were all visits at which a patient (or a representative) was expected to attend. Therefore, most patients had 12 possible visits to the clinic, at 6 of which BP should have been recorded.

The following possible visits were excluded from these denominators (as attendance was not expected and BP could not have been measured): (*i*) before diagnosis in new hypertensive patients; (*ii*) after a patient's death; and (*iii*) when a patient had been transferred out of the CHC's care. Also, interim visits were excluded for patients who had had hypertensive treatment withdrawn — attendance was due only every 8 weeks for a BP check.

Patients were classified as lost to follow-up if they defaulted repeatedly and subsequently failed to respond to being recalled.

Compliance with treatment was assessed from the proportion of patients who were expected to have collected drugs at all 12 visits (this excluded patients who had died, were newly diagnosed later than the first month, or were referred for care away from the CHC or taken off medication at any time during the study period) and who did so on nine or more (≥ 75%) occasions.

Mean BP was calculated for the whole sample (and age and sex subgroups) by aggregating individual readings, and also for each individual patient who had two or more readings during the study. Categories of BP control were based on WHO definitions (Table I). A category of 'very uncontrolled' was added, based on the BP for which immediate treatment is advised in the southern African guidelines for hypertension management in primary care.[24]

Table I. Categories of blood pressure (mmHg) control

1. Controlled < 140 systolic and < 90 diastolic
2. Borderline 140 - 159 systolic and/or 90 - 94 diastolic
3. Uncontrolled ≥ 160 systolic and/or ≥ 95 diastolic
4. Systolic uncontrolled ≥ 160 systolic and < 95 diastolic
5. Very uncontrolled > 200 systolic and/or ≥ 115 diastolic

Categories 4 and 5 are subsets of 3 and are not mutually exclusive.

Statistical analysis was performed with Epi-Info 6.0 software. The normal test was used to calculate confidence intervals for the differences in means and the chi-squared test with Yates continuity correction to test for differences in proportions.

Results

The mean and median ages of the sample (64.3 and 65 years, respectively) and of all hypertensive patients (63.3 and 64 years) were very similar. A slightly higher proportion of the sample (81.7%) than of all attenders (78.9%) were female.

Table II shows the age and sex distribution of the sample. Over half (51.6%) of hypertensive patients were aged 65 years or older. Only one-fifth were male. There was no significant difference between the mean ages of male and female patients.

Analysis by age groups has been confined to patients aged under 65 and 65 years or above, given the small number of patients aged less than 45 years.

Table II. Age and sex distribution of the sample of hypertensive patients

	All		Men		Women	
Age (yrs)	No.	%	No.	%	No.	%
< 45	51	4.6	8	4.0	43	4.8
45 - 64	480	43.8	99	49.2	381	42.6
≥ 65	565	51.6	94	46.8	471	52.6
Total	1 096	100	201	100	895	100

Ages for two patients were not reported.

Default rates were very low — patients failed to attend for between 11.9% ('minimum default rate') and 19.4% ('maximum default rate') of all expected visits to collect medication or see clinic staff. There were no significant differences in either default rate between age and sex groups.

Over three-quarters (76.9%) of patients eligible for assessment (N = 889) were compliant by our definition. Compliance among men was lower (71.4%) than among women (78.0%). This difference was not statistically significant (c^2 test; P = 0.11). There was no difference in compliance between age groups.

By the end of the study period 89 (8.1%) patients had been lost to follow-up. There were no significant differences in loss to follow-up between age and sex subgroups.

The rate of BP recording was 4.0 per 12 possible visits (expected 6.0) — a default rate of 33%. This is much higher than the maximum default rate of 19.4% for attendance and suggests that defaulting also occurred as patients (or their representatives) only attended to collect medication when clinic appointments were due. This is confirmed by comparison of the ratio of visits where BP was recorded to that of visits where only medication was collected (0.72). If defaulting occurred equally from both it would be 1.0. There were no significant differences in the rate of BP measurement between age and sex groups.

Mean BPs calculated from aggregated measurements during the study are shown in Table III. The overall mean was 158.3/89.8 mmHg. The systolic, but not the diastolic, BP of patients aged 65 years or over was significantly higher (162.3 mmHg) than that of patients under 65 years (154.3 mmHg) — a mean difference of 8 mmHg (95% confidence interval 6.4 - 9.6).

This was due to a higher mean systolic BP for women aged 65 years or older. This also explained the higher mean systolic BP among women than men — mean difference 5.2 mmHg (95% CI 3.0 - 7.4). Men aged over 65 years had a lower mean diastolic BP than women — mean difference 2.9 mmHg (95% of CI 1.4 - 4.4).

The proportions of individual readings in each of the categories of BP control are shown in Table IV. Just over half (56.7%) of all BP readings were uncontrolled. Nearly half (48.4%) of uncontrolled readings were due to uncontrolled systolic readings only. Only 6.6% of readings were categorised as 'very uncontrolled'. Uncontrolled readings were significantly commoner among patients 65 years or above (61.9%) than in those under 65 years (51.1%) (c^2 test; P < 0.001), and for women (57.8%) compared with men (51.1%) (c^2 test; P = 0.001). These differences can largely be accounted for by a higher rate of uncontrolled systolic BPs in women aged 65 years and older. Of 1 010 patients with at

Table III. Mean of the total number of blood pressure (mmHg) measurements by age and sex

	All patients			Women			Men		
	< 65 years	≥ 65 years	All ages	< 65 years	≥ 65 years	All ages	< 65 years	≥ 65 years	All ages
Systolic									
No.	2 044	2 180	4 224	1 653	1 849	3 502	391	331	722
Mean	154.3	162.3	158.3	154.2	163.9	159.3	154.6	153.6	154.1
95% confidence	153.2 -	161.2 -	157.5 -	153.0 -	162.7 -	158.4 -	151.6 -	150.8 -	152.0 -
interval	155.4	163.4	159.1	155.4	165.1	160.2	157.6	156.4	156.2
Diastolic									
No.	2 044	2 180	4 224	1 653	1 849	3 502	391	331	722
Mean	90.4	89.2	89.8	90.3	89.7	90.0	90.8	86.8	88.9
95% confidence	90.1 -	88.9 -	89.6 -	89.7 -	89.1 -	89.6 -	89.3 -	85.5 -	87.9 -
interval	90.7	89.5	90.0	90.9	90.3	90.4	92.3	88.1	89.9

Table IV. Hypertension control by age and sex groups

	All patients			Women			Men		
	< 65 years	≥ 65 years	All ages	< 65 years	≥ 65 years	All ages	< 65 years	≥ 65 years	All ages
Controlled									
No.	349	272	613	256	199	455	85	73	158
%	16.7	12.5	14.5	15.5	10.8	13.0	21.7	22.1	21.9
Borderline									
No.	657	560	1 217	564	458	1 022	93	102	195
%	32.2	25.7	28.8	34.2	24.7	29.2	23.8	30.8	27.0
Uncontrolled									
No.	1 044	1 350	2 394	831	1 194	2 025	213	156	369
%	51.1	61.9	56.7	50.3	64.5	57.8	54.5	47.1	51.1
Systolic uncontrolled									
No.	418	741	1 159	338	662	1 000	80	79	159
%	20.5	34.0	27.4	20.5	35.8	28.6	20.6	23.9	22.1
Very uncontrolled									
No.	113	164	277	81	152	233	32	12	44
%	5.5	7.5	6.6	4.9	8.2	6.7	8.2	3.6	6.1

Figures are means of all individual readings during the study period. (See Table I for definition of categories of blood pressure control.)

least two BP readings (mean 4.1), the proportion categorised as uncontrolled on the basis of their mean BP was 51.4% (44% of men and 53% of women).

Discussion

Judged by process measures such as default rate, loss to follow-up, frequency of BP measurement and collection of medication, this study demonstrated a relatively high quality of care for hypertension in a primary care setting compared with previous South African studies. Despite this, BP control, although better than in many previous South African studies, was still disappointing and the 'rule of halves' was confirmed again.

A strength of the study is the large sample size. This allowed meaningful subgroup comparisons. The prospective design and 1-year follow-up period allowed a more detailed analysis of the quality of care than had previously been attempted, and allowed assessment of BP control by a more clinically meaningful measure using the mean of multiple readings through the year.

A potential weakness is the use of a non-random sample, although comparison of age and sex breakdown of the sample and all hypertensive patients attending during the year suggests that the sample was representative. Another possible weakness was inaccuracy of BP measurement, despite the strenuous efforts to ensure standardised procedures. The first author's own observations suggest that in the context of a very busy and often understaffed clinic, the Southern African Hypertension Society recommendations are often not followed. However, doctors used the recorded BP as a basis for management decisions, so the degree of control recorded in the study is a valid measure of outcome of care.

Calculation of precise defaulting and loss to follow-up rates was difficult. For example, 'possible defaulters' (patients recorded as 'moved away' or with missing data) may have been true defaulters or may have been under treatment for hypertension elsewhere. Similarly the loss to follow-up rate may have been an overestimate if some of these patients were being treated elsewhere, or an underestimate if patients were regularly defaulting at the end of the study period, but had not yet been classified as lost to follow-up.

A striking finding was that hypertensive patients were mainly women and that over half were aged 65 years or older. A similar pattern was found in a previous study at a

Cape Flats day hospital[18] and is also the experience of the first author at two other CHCs in the Cape Flats area (D W R Lunt — unpublished observations). This contrasts with the findings from a study among private general practitioners in the same area, where the sex distribution was equal and the patients much younger.[17]

The lack of male patients at these CHCs is a cause for concern and cannot be explained by the ratio of male/female hypertension prevalence found in community surveys.[4-7] Undertreatment of coloured male hypertensives relative to females has been confirmed in community surveys, with awareness and treatment of hypertension up to 40% lower among adult men.[5,7] Two of Maxwell's criteria for assessing the quality of health care are accessibility and acceptability.[25] The repeated finding of under-representation of male hypertensives at CHCs implies that this type of primary care is not accessible or acceptable to many coloured men.

The low default rate and loss to follow-up relative to previous studies in similar settings are encouraging. This may partially reflect the use of a recall system at Dr Abdurahman, instituted in the second half of 1992. The intention was to identify defaulting patients, provide them with another clinic appointment, and for the district sister to contact non-responders at their homes. In practice, this system functioned intermittently due to lack of staff time. The rate of BP recording was not measured in previous South African studies, though the poor compliance and high drop-out rates suggest that it may have been much less frequent.

Compliance judged by collection of prescribed medication, was also much greater than reported in previous studies[20-26] (although these studies measured compliance among newly diagnosed patients and used a slightly more stringent definition of good compliance).

There are possible reasons for the mediocre BP control found in this study (D W R Lunt — personal observations). The most obvious is the high proportion of elderly patients, who were thought to be less compliant with medication by the CHC doctors and whose increased propensity to side-effects commonly resulted in less aggressive treatment. There was also a great effort at Dr Abdurahman around the time of the study to reduce unnecessary medication among the elderly. The resulting withdrawal of antihypertensive treatment may have compromised control.

Another possible reason was that as part of efforts to improve cost-effectiveness of prescribing, doctors at the CHC were asked to substitute (rather than add) cheaper drugs for more expensive ones in poorly controlled patients. This may have delayed the achievement of control.

Rates of loss to follow-up and defaulting were comparable between men and women (though compliance was non-significantly poorer among men). Interestingly, BP control was slightly better among male hypertensives. Viewed as a whole, there was little evidence that hypertensive men attending the CHC received worse treatment or were more difficult to treat than women.

The study demonstrates the potential for evaluative research in primary care and how computerisation can aid such research. Although the study has limitations, it should be borne in mind that this study represents 'real-world' research, where data were collected by one doctor working without outside support. We believe such work will be increasingly important to monitor the effectiveness and quality of primary health care and to ensure that any increased resources for primary care are directed wisely.

The study shows how ongoing monitoring can demonstrate the strengths and weaknesses of health care services and the findings suggest that the reasons for coloured men's non-attendance at CHCs need urgent investigation. This should begin with in-depth qualitative work to assess the knowledge and attitudes of these men to disease and its treatment.

Finally, the moderate degree of BP control suggests that management of hypertension in primary care can still be improved in South Africa. Research into methods of achieving these improvements, such as the use of treatment protocols and guidelines, and continuing medical education should continue to have a high priority.

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