A screening clinic for hypertension in general practice

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HYPERTENSION is a common and often symptomless abnormality carrying a high morbidity. This morbidity may be substantially reduced, at least in male patients, by adequate treatment (Veterans' Administration Co-operative Study Group 1967, 1970). Improvement is evident in patients with resting diastolic pressures above 90 mm Hg among whom congestive cardiac failure, renal damage, cerebrovascular haemorrhage and accelerated hypertension are much reduced. The complications attributable to coronary artery disease are not affected. It seems worthwhile to screen at least the middle-aged males in the community to identify hypertensive patients before they are overtaken by dangerous or irreversible sequelae. Unfortunately unresolved problems abound.

Blood pressure estimation is subject to a number of uncertainties deriving from differences in the technique of estimation and from moment-to-moment fluctuations of pressure. The incidence and natural history of the condition are still inadequately understood so that the yield of new cases that might be produced by screening methods in different communities is unknown. Even if these problems were solved however there are important administrative and economic questions to be answered. Should screening be undertaken by general practitioners or by local authority teams? What would the demands on time, staff, and money be of such a service? Who should be screened and how should they be informed? What would the response be? How should those discovered to be hypertensive be followed up?

In an attempt to throw light on some of these questions in one community, a decision was made to set up a blood pressure screening service for middle-aged males in a small industrial town in Cheshire. The population of Bollington is approximately 6,600 and they are nearly all on the list of a single group practice. About half of the adults are employed in light industry in the town and there is a growing number of residents who work in the towns south of Manchester in a variety of occupations. Those chosen for screening were all the males on the list born between 1 January 1912 and 31 December 1932 (i.e. those aged 40–60 in 1972 when screening was started). These were easily identified by a card-indexed age-sex register.

In addition to taking the blood pressure under standardised conditions it was decided to weigh the subjects and to enquire about physical exercise customarily done to provide the basis for a prospective study of the relationship of exertion to vascular disease. The occasion was also taken to enquire about smoking habits and to do simple tests of ventilatory function, forced expiratory volume in one second (FEV_1) and forced vital capacity (FVC).

Starting with the older patients, batches of between ten and 20 were written to weekly. The letter stated:

Dear . . .

Undetected high blood pressure is a common and dangerous condition which, untreated, can lead

to an early death. As a community-wide measure we are proposing to survey the blood pressure of all males between 40 and 60.

An appointment has been made for you to attend the surgery at . . . on . . .

I should be grateful if you would complete the reply-paid postcard telling us if you would be willing to attend at this time or if some further appointment could be made.

Yours sincerely,

With this went a pre-paid postcard which stated:

Mr . . .
Please tick where applicable.
I shall attend the surgery at the time stated above . . .
I am unable to attend at the time stated above but wish a further appointment to be made . . .
I do not wish to attend the clinic . . .

These letters were sent a week before the appointment. Patients were given appointments at five minute intervals and attended between 1800 and 1900 hours on a weekday.

Method

On arrival, each patient was interviewed by a nursing sister and the following information entered on a card: name, address, date of birth, occupation, physical exercise taken at work and at other times and smoking habits. Exercise at work was graded into three degrees: heavy manual, light manual, and sedentary and leisure exercise was graded as systematic and regular, occasional or non-existent. The patient was weighed without shoes or jacket but otherwise clothed. The collection of this information took about five minutes.

Each patient then went through to another room where he was seen by the doctor. A single blood pressure reading was taken on the left arm in the sitting position with a mercury sphygmomanometer using a cuff 12 cm wide with metal fasteners. The mercury was pumped up to about 20 mm Hg above the point at which the radial pulse disappeared and dropped slowly (about 2 mm Hg/sec). The systolic and the diastolic pressure were recorded, the point of muffling (phase four) being used for the latter. Readings were made to the nearest 5 mm below the observed change.

The patient was then tested on a ' Vitalograph ' and readings of FEV_1 and FVC taken. If the diastolic blood pressure was 100 mm Hg or above he was told that his blood pressure was being observed and he was asked to make an appointment for the next screening clinic for review. If the FEV_1/FVC per cent was lower than 70 and there was no known history of asthma, the smoking habits of the patient were reviewed and, if it was considered relevant, advice given on stopping smoking. This ended the screening examination. Patients with diastolic pressures over 100 mm Hg were re-examined on two subsequent occasions. If the reading remained over 100 mm Hg for all of these estimations he was told that his blood pressure was raised and would need investigating. He was referred immediately for full blood count, blood urea, serum cholesterol and phospholipids. Urine was tested for albumen and sugar and a mid-stream specimen submitted for microscopy and culture. A chest x-ray and electrocardiogram were arranged and he was asked to return for a full medical consultation on another occasion.

Patients with either one or two diastolic readings exceeding 100 mm Hg but whose blood pressure was below this level on the other attendance were told that their blood pressure was ' borderline ' and that they would be sent for again in about a year for further review.

When all the patients in the selected group had been informed once, those who had failed to attend were again circularised and given a further opportunity to attend.

Results

There were 619 males in the age range under consideration at the start of the screening period. In the course of examining records before sending for patients, 14 were found to be currently under treatment for hypertension. They were excluded. A further seven were known to be hypertensive but as they had not been seen for some time it was decided to include them. One man who failed to come when informed was found to be hypertensive when examined by one of the doctors on another occasion. He was then persuaded to attend for full assessment. A further 12 were not included because of some known disability (e.g. schizophrenia, mental defect, severe heart disease) which made screening inappropriate.

Of the remaining 593, 510 (86 per cent) attended the clinic as a response to the first or second request. Of these, 19 patients were found to be hypertensive for the first time by the criteria outlined above. In addition to this, of the seven who were known to have been hypertensive before their attendance four were found to be uncontrolled. The total number of hypertensive male patients in this age range was 40. Of these, 23 (58 per cent) were either untreated or uncontrolled (table 1). The blood pressures recorded in those found to be hypertensive are shown in table 2. In addition to these cases, 24 patients had blood pressures in the borderline region. It is intended to follow these up in the near future.

TABLE 1

ANALYSIS OF MEN ATTENDING SCREENING CLINIC

Men aged 40–60 in practice	619		
Not informed of clinic	26	Currently under treatment for hypertension	14
		Unsuitable for screening	12
Informed of clinic	593		
Number attending	510	86 per cent	
Found to be hypertensive	23	Previous record of hypertension	4
		No previous record of hypertension	19
Borderline ' hypertensive '	24		
Found to have impaired pulmonary function	72	Asthmatic	7
		Not asthmatic (94 per cent smokers)	63

There were 72 patients with a FEV_1/FVC per cent less than 70. Seven of these were known to have asthma. Of the remaining 63, 60 were smokers (94 per cent, compared with 65 per cent among those with normal pulmonary function). These were warned against further smoking, the gravity of the warning being matched to the degree of impairment.

The reception of the screening clinic in the community was very favourable. Many welcomed the opportunity to have their blood pressure measured and were delighted that their doctor had taken the initiative in requesting their attendance.

TABLE 2

BLOOD PRESSURES OF MEN FOUND TO BE HYPERTENSIVE (READING ON THE THIRD ATTENDANCE)

Number	*Age*	*Blood pressure*
1	43	180/125
2	59	215/110
3	52	170/105
4	44	200/105
5	52	205/120
6	50	155/110
7	53	210/140
8	44	170/110
9	59	175/115
10	48	180/120
11	57	200/125
12	58	155/110
13	45	170/105
14	60	160/110
15	58	160/105
16	58	180/110
17	56	170/110
18	55	180/105
19	59	205/105
20	47	160/105
21	44	180/105
22	56	205/120
23	53	170/105

It is planned to follow up the screening clinic by systematic examination of those reaching the age of 40 (using the age-sex register) and of new entrants to the practice between the ages of 40 and 60. A treatment clinic is being established to follow up those patients known to be hypertensive.

Discussion

Commenting on the discovery that over half of those workers in Chicago who were found to be hypertensive at a screening clinic had not been previously diagnosed and that of those known to have elevated blood pressures before screening, only 11·2 per cent were receiving effective treatment, Schoenberger *et al.* (1972) state " it must be concluded that our nation has a sizeable unresolved problem of control of hypertension and an urgent need to implement effective approaches for the management of this serious mass disease ". The situation would seem to be essentially similar in Britain.

The Joint Sub-committee on Screening in Medical Care of the Standing Medical Advisory Committees of England, Wales and Scotland published in 1971 a report acknowledging the need for screening for hypertension but suggest that more preliminary trials need to be done to find out how many persons there are with elevated diastolic pressures of which their general practitioners are ignorant. More work needs to be done also to test the efficacy of therapeutic regimens of different kinds, and among other groups, such as women and the elderly of both sexes. There are, they conclude, " many uncertainties as to the optimal pattern of testing, staffing, administrative and data handling methods, the role of general practitioners before the general introduction of screening for hypertension as a national service " (Rose, 1971).

Hart (1971) has described the semi-continuous screening of a Welsh mining community for hypertension and argues that such a service is feasible with existing

resources from the basis of primary medical care, and achieved a 98 per cent response. This astonishing attendance may owe not a little to local conditions as well as to his own enthusiasm. He was prepared to follow up defaulters to their homes. He concludes that in the absence of screening about half the cases of hypertension which might need treatment will be missed over a seven year period. The experience reported here from a community of mixed industrial and white collar workers would justify a similar conclusion, and shows that a reasonable response (86 per cent) can be achieved by relying on postal requests.

Since the publication of the second part of the Veterans Administration Co-operative Study Group on Antihypertensive Agents (1970) the discovery that patients with diastolic pressures ranging from 90–114 mm Hg could often be saved from sequelae by effective treatment has given added urgency to the need for screening. These patients were only included after registering such an elevated diastolic pressure following three days of hospital admission. This obviously does not correspond to similar levels found on casual examination. The cut-off point in our clinic was therefore placed 10 mm Hg above the American figure.

Attendance at a screening clinic may lead to a ' defence reaction ' resulting in an erroneously high reading (Ayman and Goldshine, 1940). Armitage *et al.* (1965) state that the prevalence of hypertension will be overestimated by at least 17 per cent on the basis of single casual blood pressure readings. They conclude that multiple readings will much reduce these false positives. Ideally it would have been preferable to take a number of readings on all our subjects. Practical considerations however made this impossible and a compromise was adopted in taking three readings in those patients found initially to have diastolic pressures above 100 mm Hg and only regarding those patients who sustained this level throughout as warranting immediate investigation. The diastolic point adopted (phase four) followed the recommendation of the Sub-committee of the Postgraduate Education Committee of the American Heart Association (1967) and the technique for estimating blood pressure followed the procedure advocated in the same paper.

Hart (1971) in Glyncorrwg found seven per cent of males aged 40–65 to be hypertensive using the same criteria as those adopted in the present study. Out of 524 males in Bollington whose blood pressures are known, 40 (7·6 per cent) are hypertensive. Of these, 47 per cent were previously unknown, compared with 61 per cent in Glyncorrwg and 59 per cent of those discovered in Chicago (Schoenberger *et al.*, 1972). In addition, a further ten per cent were known but found to be inadequately controlled.

The feasibility of organising a hypertension screening clinic in the context of primary health care in Britain has been shown. There was no call for additional staff and the running of the clinic was fitted into the everyday work of the practice. Screening elicited a high degree of acceptance among the patients both in terms of attendance and satisfaction expressed.

Additional advantages of mounting such an enterprise from a general-practice setting are that follow-up and treatment are in the same hands, borderline values can be watched for a number of years, and that an improved attitude to community welfare is generated amongst the doctors and the patients. The occasion can also be used as an opportunity to lay the basis for longitudinal studies, or for collateral screening such as that undertaken here of pulmonary function.

Summary

A blood pressure screening clinic was run by a general practice in a small industrial town in northern England. Five hundred and ninety-three males aged between 40 and 60 were informed, and 86 per cent attended; of these 19 were found to have sustained diastolic blood pressures over 100 mm Hg and had no previous record of hypertension.

A further four who had previously been found to be hypertensive but who had stopped treatment were found to have blood pressures in the same range. Fourteen patients were not informed because they were currently receiving treatment for hypertension.

It is concluded that in the age range chosen 58 per cent of all hypertensive males were untreated. Screening for hypertension could be an important contribution to public health and it is argued that this should be carried out by general practitioners.

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