Effectiveness of screening for hypertension in Scotland

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Summary
1. Data from long-term follow-up of subjects screened for hypertension indicate that elevation of blood pressure represents a major contribution to community-attributable risk of death.
2. Attendance rates at screening, and drop-out rates from follow-up, have been assessed in studies in Glasgow.
3. Screening and follow-up are probably best conducted from general practice, and should be regarded as an extension of good primary care.

Key words: hypertension, screening, trial.

Introduction
At present the management of high blood pressure seems the most promising approach to the problem of preventing cardiovascular disease (Report of a Joint Working Party, 1976). The condition meets most of the criteria for screening. These include constituting an important hazard to health, having an acceptable means of diagnosis at an early asymptomatic stage and an acceptable form of treatment (Wilson & Jungner, 1968).

However, as over 85% of patients are in touch with their family doctor at least once in a 3 years period, this contact could be used to carry out screening by the practitioner or by a specially trained assistant. A recent pilot study has shown this to be a practical and worthwhile procedure (Hawthorne, 1975b).

Although it is agreed that patients with a diastolic blood pressure consistently higher than 110 mmHg should be treated (Werkö, 1975; Veterans Administration Co-operative Study Group on Anti-hypertensive Agents, 1967), there is less certainty about lower pressures, particularly in the prevention of coronary heart disease (Veterans Administration Co-operative Study Group on Anti-hypertensive Agents, 1970). A number of multi-centre trials are in progress in France, North America, Sweden, Australia (Reader, 1975) and the United Kingdom to assess the benefits of treating mild hypertension, and the results are awaited. In the meantime sufficient experience has been gained in Scottish studies (Hawthorne, Greaves & Beevers, 1975) and the U.K. national trial (Miall & Brennan, 1975) to provide a preliminary assessment of effectiveness on the detection, response to treatment and ‘drop-out’ rates in the large-scale management of hypertension (Adler, d’Souza & Holland, 1975).

Methods
Screening survey examinees are asked for written consent to consult health records and medical record linkage is established through the Registrar General, the Scottish Home and Health Department and the general practitioner. The Registrar General notifies deaths to the screening unit monthly and sufficient have now accrued from earlier studies (Hawthorne, Gillis, Lorimer, Calvert & Walker, 1969; Hawthorne, Gillis & Maclean, 1972) to allow the relative and excess mortality risk for the individual and the community to be assessed; 137 deaths from ischaemic heart disease (ICD codes 390–458) have occurred in 1432 males observed over 10 years. To improve specificity the sample was divided into two age groups: 45–54 years and 55–64 years (Hawthorne, 1976).
The sub-groups were then sub-divided arbitrarily into 80, 15 and 5% of the distribution of blood pressures, an allocation which produced three categories approximating to normotensive, mild to moderate and severe hypertensive ranges.

Relative risk was calculated as the incidence in the affected (either mild to moderate or severe) divided by the incidence in the non-affected (taking the 80% range as normotensive).

Attributable or excess risk was the incidence in the affected (either range) less the incidence in the non-affected. The community risk was obtained by multiplying the attributable number of deaths: 8.8 in this category.

The community risk is derived by multiplying the attributable or excess risk (56.8) by the prevalence (154). The two ranges of elevated blood pressure produced 17.2 of sixty-eight deaths indicating responsibility for 25.3% of the mortality.

Attempts to reduce the mortality attributable to hypertension include screening programmes and follow-up clinics. The value of these in managing large numbers of hypertensive subjects remains unproven, but pending the results of clinical treatment trials it is reasonable to assess the efficiency of screening and management, and to examine defaulter and drop-out rates.

In Paisley, the special census revealed that 16 013 subjects were eligible for examination, being aged 45–64 years; of these 11 926 (74.5%) attended the screening centre and were examined. Subsequently special efforts were made to examine non-responders, who received further invitations to the screening unit, and the attendance rate was thus increased to 78%.

At screening, 2401 subjects (23.5%) were found to have diastolic blood pressures between 90 and 100
mmHg, and these were asked to attend again for further estimation. The attendance rate at re-screening was 90.5% of those eligible. Subsequently 132 subjects (1.3% of the population studied) were invited to take part in the MRC Treatment Trial of mild to moderate hypertension (Miall & Brennan, 1975). 124 (93.1%) agreed and attended the special follow-up clinic established for this purpose. After 12 months the cumulative lapse rate from the trial for cases receiving active therapy was 6.7%, and for cases receiving placebo therapy 9.8%.

The MRC Treatment Trial of mild hypertension currently includes 1156 cases whose untreated diastolic pressure fell between 90 and 109 mmHg. 243 of these cases have been entered from three centres in Scotland (Renfrew, Paisley and Glasgow).

Amongst clinic attenders in the trial the incidence of neurosis has been estimated by the administration of a questionnaire based on the General Health Questionary together with psychiatric interviews (Stage 1 and Stage 2 Screening) (Goldberg, 1972). Comparison of those referred to the blood pressure follow-up clinic during assessment and after admission to the trial together with normotensive control subjects has shown no significant increase in neurosis on admission to the trial and a statistically significant lower incidence among participants compared with control subjects (A. H. Mann, personal communication).

Discussion

Hypertension of mild to moderate degree is generally asymptomatic and the condition cannot be relied upon to reveal itself (Beever, Hawthorne & Sinclair, 1975). Fortunately, the examination is quick, cheap and acceptable. The skill is readily taught to lay staff whose performance can be monitored. A single blood pressure reading is a powerful indicator of the risk of coronary heart disease; the presence of even moderately elevated blood pressure is of prognostic significance (Report of a Joint Working Party, 1976). But perhaps most interest in high blood pressure lies in its relationship to other risk factors in cardiovascular disease including smoking, hypercholesterolaemia, glucose intolerance, physical inactivity, radiological or electrocardiographic evidence of left ventricular hypertrophy and their combined contribution to patient management in primary and secondary preventive medical care. Thus the risk of cardiovascular mortality more than doubles above 116 mmHg diastolic in men aged 55–64 years and would double again in a smoker. The combined risk of several risk factors is multiplicative rather than additive (Report of a Joint Working Party, 1976).

The effectiveness of schemes for detecting blood pressure can be assessed by response to screening, the ‘drop-out’ rate and outcome of treatment (Adler et al., 1975). In the West of Scotland response in 29,000 subjects identified from wages and salary rolls, occupational grouping or by census from the general population, has been generally above 75%, a level indicating that at least three out of every four persons would participate in any national scheme that might be developed in the future. A special non-response survey in Paisley has raised the response to nearly 80%.

It has been estimated that a definitive trial of the benefits of drug therapy might involve screening 200,000 subjects to produce 1000 patients each in the control and treated groups. Experience in Scotland suggests a considerably larger number would need to be screened but this estimate could be influenced by a higher proportion of patients excluded from the trial. Less-rigid criteria might result in a larger number of entrants to the trial.

Sackett and others have reported poor compliance in patients undergoing treatment, but this has not been the finding in the U.K. trial and Scottish trial (Sackett & Holland, 1975; Hawthorne, 1975a; Sackett, 1974). If exclusions from the trial for medical reasons are not taken into account, the true lapse rate of persons no longer being followed is only 14%, and this figure might be further reduced by extensive education programmes for patients and their family doctors.

With regard to outcome, all that is known is the extent to which blood pressure can be reduced by treatment, and not whether such reduction leads to prevention of cardiovascular disease, particularly in the mild hypertensive group. However, in men 45–54 years with systolic blood pressure in the range 145–176 mmHg the attributable or excess risk is 56.8 per 1000 over 10 years, an annual excess incidence of 5.6 per thousand. From the community or health service resource viewpoint the number of attributable deaths is a more important measurement and in this instance would indicate that assuming complete effectiveness in the treatment of systolic blood pressure in the range 145–176 mmHg (presumably by reducing and maintaining each of...
the 154 men to a level below 145 mmHg over 10 years), the number of deaths and their consequences might be reduced from 18 to 9.2. An even greater saving and a more certain contribution could have been made by controlling the forty-three males with systolic pressures $\geq 177$ mmHg, where theoretically eleven deaths could have been reduced to 2.6. The most important implication of these observations for the patient and the community is that the greatest contribution to be achieved by effective control is in the middle ranges of graded risk. This is because in addition to being more susceptible to treatment the numbers are large.

Studies of attendance rates of patients on general practitioners' National Health Service lists have indicated that over 85% consult their family doctors over a period of 3 years (Beevers et al., 1975). As less than half of those with raised blood pressure are being detected in the community at present, this high attendance rate offers an opportunity to raise the examination rate and increase detection. In a pilot study presently in progress in four practices in the West of Scotland, either the receptionist or practice nurse examines the blood pressure once in all males above 30 years attending the surgery (Hawthorne, 1975b). Between 8 and 14% have sustained high blood pressure, of which about half are unknown to the patient or doctor. It is expected that by the end of 3 years over 75% of those eligible will have been examined. This study suggests a solution to the problem of developing a cheap and acceptable extension of the existing provisions of the National Health Service whilst maintaining the prerogative of the general practitioner to provide primary prevention.

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References


