

# An emerging consensus among clinicians on treating mild hypertension but persistent uncertainty as to how blood pressure should be measured

**ABSTRACT**—In 1986 and 1989 the British Hypertension Society published its recommendations on the techniques for the measurement of blood pressure and the level of pressure requiring drug therapy. In order to assess the impact of these recommendations on clinical practice among non-members of the society, we have conducted a survey using a self-reported questionnaire among 196 hospital-based clinicians, and compared our findings with a similar survey conducted in 1979. The response rate to the 1990 survey was 64% (126 respondents). Over one-third (37%) of respondents reported that they usually record the diastolic blood pressure at the fourth Korotkoff phase (muffling of sounds), 52% reported that they use the fifth phase (disappearance of sounds), and 10% reported that they record both the fourth and fifth phase. They also disagreed considerably on a number of other basic issues, including whether blood pressure should be routinely measured in the sitting or lying position, and whether readings should be taken to the nearest 2, 5 or 10mmHg. A clear majority of clinicians indicated that they would prescribe anti-hypertensive drugs if the diastolic blood pressure was consistently over 100mmHg. This represents a marked shift from the opinions expressed in 1979 and is in line with the British Hypertension Society's recommendations. However, many clinicians still measure blood pressure in a manner contrary to the society's guidelines.

Hypertension poses a major challenge to contemporary medicine. It is now one of the most common indications, in developed countries, for the initiation of lifelong drug therapy. It is important therefore for clinicians to be familiar with current views both on the detection and on the management of this condition.

In 1979 we surveyed the views of hospital staff on detecting and managing hypertension [1] and a sim-

ilar survey was published soon after from St Bartholomew's Hospital, London [2]. Views diverged on such basic issues as how to measure blood pressure and the level of blood pressure at which treatment should be initiated. Most respondents reported that they recorded diastolic blood pressures at the fourth phase (muffling) of Korotkoff sounds, and the majority also said that they would prescribe drug therapy in a 50-year-old man only if the diastolic blood pressure was 105mmHg or greater. In the intervening decade a succession of publications have addressed these issues. Several major clinical trials reported reduced stroke mortality (and to a lesser degree coronary artery disease mortality) associated with the treatment of mild hypertension with diastolic pressures in the 90–110mmHg range [3–7]. In addition, the British Hypertension Society has published recommendations on the best techniques for blood pressure measurement and suggested that diastolic pressures should be measured at phase V (disappearance of sounds) in non-pregnant adults [8]. The society subsequently recommended that sustained diastolic pressures of 100mmHg or more, which are unresponsive to advice on life-style, merit antihypertensive drug therapy [9]. The object of the present study was to determine, using methods similar to those employed in the 1979 survey, how far these recent developments have affected clinical practice.

## Methods

Questionnaires (Table 1) were sent to all 196 clinicians working full-time in Dudley Road Hospital, Birmingham, a district general hospital with a catchment area of approximately 300,000 people. We excluded radiologists and pathologists from this survey as they do not normally examine or treat patients for hypertension. The questions were the same as those used in our 1979 survey [1], and we added questions on the best posture of the patient when blood pressure is measured in the outpatient department, the desired precision of

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**Table 1.** Questionnaire details

1. Should blood pressure be measured in all inpatients?  
Yes/no.
2. Should blood pressure be measured in all outpatients?  
Yes/No.
3. In what position do you usually measure blood pressure in outpatients? Sitting/lying/standing.
4. Do you have access to a large cuff? Yes/no.
5. How often have you used a large cuff in the past 4 weeks? Fewer than 2 occasions/2-6 occasions/more than 6 occasions.
6. Do you record Korotkoff stage IV, Korotkoff stage V, or both?
7. Do you measure blood pressure to the nearest 10/5/2 mm Hg?
8. If the blood pressure is elevated, how often do you repeat the recording at the same visit: 0, 1, 2 or 3 times?
9. Do you act upon the lowest/highest/average/final recording?
10. At what level of diastolic blood pressure would you begin to treat an asymptomatic 50-year-old man for hypertension with drugs: 90, 95, 100, 105, 110, 115, 120 mm Hg?

measurement, and the availability and use of 'large adult' cuffs in patients whose arm circumference exceeds 33cm. Information was also gathered on the need for and the interpretation of repeat recordings where the first reading had been found to be high, and the level of sustained diastolic blood pressure at which antihypertensive drug therapy would be initiated. Data on the respondent's specialty, year of qualification, location of work within the hospital, and grade in employment were also obtained. The response rate, following repeat mailing to all non-respondents, was 64% (126 respondents). Among consultant physicians (all medical subspecialties and paediatrics) the response rate was 88% (23 respondents), consultant surgeons 33% (7 respondents) and consultants in other disciplines 62.5% (10 respondents).

The data were analysed using minitab statistical software. The normal approximation to the binomial distribution was used to compare proportions with estimation of p-value and derivation of 95% confidence intervals for the difference between proportions.

## Results

Most clinicians (52%, n=65) reported that they now record diastolic blood pressures at the fifth phase. Of

the physicians surveyed (all grades) 63% (n=39) indicated a preference for fifth-phase diastolic pressures as compared with 38% among non-physicians (95% confidence interval for difference 3% to 38%, p=0.02). In all, 37% respondents reported that they still recorded diastolic blood pressure at the fourth phase and 10% that they employed both the fourth and fifth phases. Clinicians who favoured fourth-phase diastolic pressure were slightly, though not significantly, more senior than those who favoured fifth-phase pressure. Similarly, within the group of physicians there was no significant difference in terms of seniority between those favouring fourth- or fifth-phase diastolic pressure.

These figures contrast with our 1979 survey where 64% of clinicians reported that they measured diastolic blood pressures at the fourth phase, only 18% employed the fifth phase, and the remainder (17%) reported that they measured both fourth and fifth phases. These data indicate that an increasing number of physicians now measure blood pressure along the guidelines of the British Hypertension Society, which were first published in 1986.

Virtually all doctors (96% n=121) felt that blood pressure should be measured as a routine in all inpatients, and a majority (76% n=96), including surgeons, felt that blood pressure should be measured as a routine in all outpatient new consultations. The seated position was favoured for measuring blood pressure in the outpatient clinic by 65% of respondents, the remainder indicating a preference for the lying position.

Only 57% of respondents were aware that they had access to a 'large adult' cuff when measuring the blood pressure in patients whose arm circumferences exceeded 33cm. Not surprisingly, therefore, only 3% had used a large adult cuff on more than six occasions in the previous four weeks, 18% had used one on two to six occasions, and 79% had used one on fewer than two occasions.

Only 26% of doctors (n=32) routinely measured both systolic and diastolic blood pressures to the nearest 2mmHg, as recommended by the British Hypertension Society. The majority (67%) indicated that they record blood pressure to the nearest 5mmHg despite the fact that the glass manometer tubing does not have a 5mmHg graduation mark on it. 6.5% of respondents recorded blood pressures to the nearest 10mmHg. If the initial screening blood pressure was found to be elevated, 13% of respondents did not normally repeat the measurement, whereas 53% reported that they repeated it once, and 27% and 7% indicated that they would repeat it twice and three times respectively. There was, however, confusion as to which reading should be acted upon: 41% of respondents favoured the lowest recording, 28% the average recording, 26% the final recording, and 5% opted for the highest recording when making clinical decisions.

The level of diastolic blood pressure at which

**Table 2.** Level of diastolic blood pressure at which clinicians would treat an asymptomatic 50-year-old man with drugs in 1979 (N=76) and 1990 (N=126). Figures are numbers (%).

	Diastolic blood pressure (mm Hg)						
	90	95	100	105	110	115	120
1979	1 (1.3)	4 (5.3)	20 (26.6)	16 (21.3)	16 (21.3)	2 (2.6)	1 (1.3)
1990	3 (2.3)	25 (19.8)	65 (51.5)	7 (5.5)	4 (3.1)	1 (0.8)	1 (0.8)

No opinion: 1979 14 (18.6%); 1990 20 (15.8%).

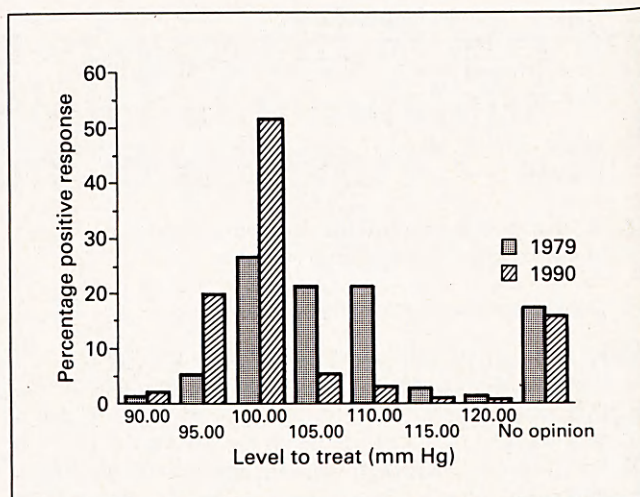
respondents would now give antihypertensive drug therapy to a symptomless 50-year-old man had fallen since 1979 (Table 2; Fig.1). A clear majority (88%, n=93) of the 106 respondents who expressed a view on this issue indicated that they would prescribe drugs if the diastolic pressure was 100mmHg or more. This is in line with the British Hypertension Society's recommendations and contrasts with the 1979 survey when only 41% of clinicians would have treated this level of blood pressure. Of physicians responding to this question 95% (n=51) would prescribe drug therapy for a diastolic pressure of 100mmHg or more, as compared with 84% of non-physicians (95% confidence interval for difference -17% to 7%, p=0.2). A similar proportion of consultant and non-consultant staff would prescribe antihypertensive therapy at this level of diastolic pressure.

### Discussion

This survey of blood pressure measurement and treatment practices conducted 11 years after our initial survey does show that clinical practice in our district general hospital has changed considerably. In 1979 we referred to 'diastolic anarchy'. The current survey provides some grounds for encouragement as more respondents are now adopting British Hypertension Society guidelines with a shift towards the use of the fifth-phase diastolic pressures. However, considerable confusion still remains.

The British Hypertension Society guidelines state unequivocally that, in the outpatient setting, blood pressure should be measured to the nearest 2mm Hg in the seated position and with arms supported at the level of the heart, using a cuff with a bladder of adequate size relative to the patient's arm circumference [7]. The Society recommends that decisions should be based on the average of two or three readings repeated over several visits. Our data suggest that there is need for greater awareness on these simple recommendations, which are designed to reduce measurement error.

Turning to the level at which clinicians now prescribe antihypertensive therapy for mildly hypertensive



**Fig. 1.** Level of diastolic blood pressure at which clinicians would treat an asymptomatic 50-year-old man with drugs in 1979 (N=76) and 1990 (N=126)

patients, the findings of our most recent survey are broadly similar to those reported in a questionnaire circulated to members of the British Hypertension Society where the majority of members indicated that they would routinely treat diastolic blood pressure of 100mmHg or more [10]. It appears, therefore, that in the present survey the generalists have broadly similar clinical practices to the specialists in the British Hypertension Society membership. Clearly, generalists are impressed by the evidence that treating mild hypertension saves lives, particularly with prevention of stroke.

How rapidly and to what extent do research findings and clinical guidelines alter clinical practice? [11]. It has been suggested that while research and guidelines may influence attitudes or self-reported practice, they tend to have little effect on what people actually do. This survey has provided evidence of a clear shift over the past decade in attitudes and self-reported practice with regard to the measurement of blood pressure and the management of hypertension. Our data provide evidence of an increasing awareness among clinicians of a growing consensus on the best method of managing hypertension, and this should lead to more efficient and effective control of hypertension and benefit to patients.

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